The TROPICAL AGRICULTURIST MONTHLY.

XX. COLOMBO, JANUARY 1st, 1901. No. 7.

SOME CATERPILLAR PESTS OF THE TEA PLANT.*

(*Concluded from page 374.*)

NO. 5.—The "Morowak korale Nettle-grub." *Thosea recta*, Hampson.

The eggs of this species have not yet been observed, but they are probably laid upon the surface of the leaves.

Caterpillar: lozenge-shaped, slug-like, of an applegreen or yellowish-green colour, often with a series of irregular red patches on the back. Stinging spines arranged on small tubercles in a marginal and two dorsal series. Head concealed on the under surface. The insect has no legs, but progresses in a slug like fashion. The fully grown caterpillar measures from ½ to ¾ inch in length.

Cocoon: dark brown, egg-shaped, compact, and smooth, attached either to the under surface of a tea leaf or in the angles of the twigs and stems. When the pest is at its height, the cocoons may be found in clusters on the twigs, the leaves of the trees having been completely devoured. Specimens kept in captivity remained as cocoons for from 17 to 21 days.

Moth: grayish brown, with a rather furry body. The female has a blackish spot in the centre of the fore wing and two faint lines, one near the base and the other near the tip. The basal line stops short of the front or costal edge of the wing. The male has a darker patch at the base of the wing bounded by a short white streak which (as in the female) does not reach the costal edge. The male moth has an expanse of ¾ inch. The female is rather larger measuring slightly more than an inch across the expanded wings. The male may also be distinguished by the stouter (feathered) antennæ, the corresponding parts of the female being thread-like. (Excellent figures of the caterpillar, cocoon, and moth appeared in "The Indian Museum Notes," Vol. IV., No. 2.)

I have been acquainted with the present species as a tea pest, for about eight years. A correspondent, writing in the *Ceylon Observer* of July 27, says that he can remember a severe attack as far back as 1885. I first received specimens from the Ambagamuwa district, where large acreages of tea were defoliated. I next heard of it from Balangoda. The pest has probably asserted itself repeatedly in different districts, but the outbreak in Morowak korale seems to have caused a quite unprecedented scare. The superintendent of the estate on which it made its first appearance in that district has kindly supplied me with the following particulars:—

"I first noticed it on July 15; it was seen on about half an acre of tea. After two days it had spread over about 3 acres, and then at the rate of about five acres a day over 25 acres of tea. [This rapid extension of the affected area could not have been caused by any actual migration of the army of caterpillars, which are sluggish and travel very slowly. It is doubtful even if they wander far from the bush upon which they were born. It probably arose from successive batches of eggs hatching out on consecutive days, deposited by months which had dispersed from the centre of infection, where a smaller previous brood had undergone its transformations unnoticed.—E.E.G.] The damage done was not of a permanent nature; but the caterpillars eat out almost every vestige of green leaf, and the whole 25 acres were stripped almost bare. When I found I could not prune quick enough to overtake its spread, I pruned broad belts round the area attacked, burning the prunings and sweeping the ground. I found the insects seemed unable to cross these belts, and as I pruned out all the tea inside it died fast, exposure to the sun and want of sustenance apparently combining to kill it.

"In about five weeks from its first appearance it had disappeared nearly entirely, although I found a few insects here and there in other parts of the estate. When, however, the young flush grew (about

**Royal Botanic Gardens' Circular*, No. 19.

five weeks after pruning) I found it covered with a minute form of the same insect. Under the lens it showed the same shape, colour, &c., as the original insect, and here and there it grew to nearly full size after some days. I stripped all the young flush off for about four rounds, and after that it again disappeared and I have not been troubled with it since. [This renewed attack after pruning can only be accounted for by supposing that a number of the cocoons had escaped observation at the time of pruning, being possibly concealed in the angles of the stems and branches. These may have emerged as moths in three weeks' time and, failing leaves for the purpose, laid their eggs on the bark of the pruned trees. The eggs would have hatched out in about 10 days, when the young larvæ would commence feeding on the new flush. It is doubtful if they would have thriven under these conditions, as these caterpillars usually prefer the more mature leaves and avoid the young flush.—E. E. G.] I cannot find out anything about its propagation, which has puzzled me completely. I could find no trace of the moth; but on all the trees attacked small round cocoons, black, about the size of a pea, with a smooth bark-like shell and a neat little trap-door at the top. were deposited thickly where the branches forked. I was astonished to find that whereas at first insects about half or three-quarters size emerged from these shells, later on a considerable proportion of them hatched out a grub-like winged insect, something like a white ant, but with small wings. I found, moreover, that as the full-sized insects died they shrivelled up, and in many cases I found small white lice-like insects clinging to the carcasses. I am inclined to think it was from these that the very small grubs which attacked my young flush came."

There must have been some error of observation here. The insect develops in quite the normal way, from egg to caterpillar, caterpillar to chrysalis (enclosed in its cocoon), and finally chrysalis to winged moth. It is possible that some confusion may have arisen from cocoons having been broken open, when the caterpillar, reduced in size, would be observed awaiting its transformation into the chrysalis stage. I cannot explain the "grub-like winged insects," unless they could have been the newly-hatched moths, before their wings had properly expanded. The "white lice-like insects" were undoubtedly mites, which quickly swarm upon such dead matter, and could, of course, have had no connection with the subsequent brood of small caterpillars.

Before this outbreak could have assumed the proportions described in the above correspondence, there must have been at least two earlier and smaller broods. I can only repeat my warning—to keep a good look-out for these preliminary broods, and destroy them before they have had time to gain ground. When the pest is at its height, if the attacked field is nearing the proper time, pruning will be the best remedy, care being taken to effectually destroy all the prunings, and to search for and remove all cocoons attached to the stems of the trees. If the field is only just coming into bearing, the foliage may be thoroughly sprayed with arsenate of lead or some similar insecticide, which will poison the leaves and the caterpillars feeding upon them. No leaf should be plucked from such trees for at least 14 days. The actual leaves that will then be taken will have been disclosed since the application of the poison.

No. 6.—The "Green Nettle-grub," *Thosea cana* Wlk.

The caterpillar of this moth is practically indistinguishable either in form or colour from that of *Thosea recta* described above. It is perhaps more usually without the red patches on the back, but this character is very variable in both species. The two insects have similar habits and appear to be equally destructive.

The moth of *T. cana* may be distinguished by its more uniform grayish-brown colour and by the absence of the short white-streak which marks the fore-wing of *T. recta*. *T. cana* has two indistinct brownish lines accross the wing, with a small brown speck in the space between them.

I have recently received specimens from the Kelani Valley district, where the pest appears to have been prevalent for more than a year, and to have steadily increased its area of attack in spite of persistent attempts to check it by handpicking. My correspondent wrote as follows in March of the present year:—

"The insect is just now present in great numbers I am catching as many as 2,000 per cooly. It attacks the same field every time, a somewhat poor jat of tea, appearing—as far as I can make out—about every two or three months. Sick and small bushes are quite denuded of leaves. On healthy trees the leaves are almost eaten through, a thin skin only being left on upper side of leaf. [This is the work of the quite young caterpillars. The older insects will eat right through the leaf.—E.E.G].) This insect appears to me to change colour as it grows, being at first green with yellow with a somewhat transparent appearance. [This is just before pupation.—E.E. G.] I can find no cocoons, nor any eggs; the insect seems to come all at once. [The eggs would be extremely difficult to detect. The cocoons are probably attached to the stems.—E.E.G.] Healthy indigenous tea adjoining the fields attacked has so far escaped, with the exception of a very few individual trees. For the past three weeks we have had a most severe drought, and this attack is, I think, the worst I have experienced. A portion has just been cut across and allowed to run up again. Out of an area of 635 acres, all in one block, two fields only, one of 100 acres (2½ years) and another of 100 acres (1½ year), are attacked. A field in which the insect first appeared is now quite free."

An examination of particulars of rainfall supplied by the same correspondent for the year 1899 seems to show that the pest was at its height during the S.W. monsoon. April, with 20·35 inches; May, 27·55; June, 21·52; July, 10·72; and August, 5·47, are bracketted together with the remark that the caterpillars were very numerous over 80 acres, and that the collecting coolies were bringing in from 1,000 to 1,200 insects apiece. In September, October, and November, though a larger area was involved, the caterpillars are reported as being "not nearly so numerous."

In the above case large numbers of coolies have been employed in collecting and destroying the caterpillars, but apparently with little success in checking the attack. The fact is, that when once the pest has attained such vast proportions, it is almost impossible to eradicate it by artificial means. One-hundredth part of the same energy applied at the time of the earliest broods would have been much more effective. In young tea, such as the above, which is not in plucking, spraying with some arsenical compound could be freely employed without any possible danger.

No. 7.—The "Fringed Nettle-grub," *Natada nararia*, Moore.

Egg; very inconspicuous, oval, flattened scarcely raised above surface of leaf, very pale green, transparent, showing the colour of the leaf through it. They are laid singly on the upper surface of a tea leaf, and can only be distinguished by holding the leaf at an angle, when the surface of the eggs shine with a metallic iridescence.

Caterpillar; varying in colour, pale green, yellowish green, or whitish green, often with a broad reddish brown or purplish stripe on the back, which is constricted or interrupted at a point near the middle and again near the hinder extremity. This dorsal stripe has usually a darker outline of the same tint. All round the margin is a fringe of long pointed tubercles bearing tufts of stinging spines, and a row of smaller spiniferous tubercles on each side of the

dorsal stripe. The spines on three or four of the tufts on each side near the head are blackish; all the others are green. The head, as usual in this family, can be withdrawn into a little pocket, and the caterpillar has no legs. When fullgrown it is little more than half an inch in length. It rests on the under surface of the leaves.

Cocoon; broadly oval, almost globular, dull reddish-brown, smooth. The moth escapes by a lid-like opening at one end. The cocoons are attached either to the leaves or twigs of the plant, or to the fallen leaves and rubbish below the tea.

Moth; male, pale ochreous, the middle of the fore-wing covered by a reddish brown patch, in the centre of which is a black spot. Antennæ strongly feathered. Expanse ¾ inch. Female, dull brownish-ochreous, fore-wing darker. Antennæ thread-like, Expanse 1 inch.

Moths in captivity emerged from the cocoons after 17 days,

The Uva tea districts seem to enjoy almost a monopoly of this species as a tea pest. Though it is a widely distributed insect throughout the Island, and certainly occurs in all the tea districts, yet I have received no reports of damage to tea or of its occurrence in unusual numbers in the Central Province.* My first acquaintance with it—in its character of a pest—was in November, 1897, when I received specimens from Badulla. And quite recently several estates in Passara have suffered severely from the same insect. A correspondent writing on the 10th January, says:—

The pest was first noticed on this estate early in July last year, when the caterpillars were half-grown, alolng the roadsides, under the Grevilla trees. They gradually spread over almost the whole estate, stripping about 100 acres of all leaves. For some time 500 coolies were collecting a bushel a day of the cocoons from under the fallen leaves. They seem to turn to chrysalis, moth, and caterpillar simultaneously in all parts of the estate, and run through the changes of their existence in about two months. Early last November, in many of the fields, clouds of the moths appeared at dusk. The moths were in existence also early in September. They completely disappeared for about three weeks while the eggs were hatching. I have never identified the eggs. At the time I write there are still a few cater pillars to be found, but I hope, if January continues wet, the damp may kill the survivors, as it has done before. I found them also on many jungle trees near the tea fields."

This correspondent adds memoranda of the monthly rainfall, from which it appears that the broods of July, August, and September occurred during the spell of comparatively dry weather, but the brood that was so noticeable early in November followed a distinctly wet month, October showing a fall of 15·94 inches.

In April of the present year I personally visited the Passara district and the estates that had been subject to this pest. The bushes had completely recovered from the attack, and no permanent damage was noticeable. The superintendent, however, was of opinion that there was not such good wood to cut into at the next pruning as should have been found in a healthy field. I was informed that the cocoons were nearly always found under fallen leaves b elowthe bushes—often attached in clusters of five or six to dead Grevillea leaves, seldom on the leaves or twigs of the growing plant.

During my visit moths of *Natada nararia* were flocking into the verandahs of the bungalow at dusk, attracted by the lights. I experimented with a simple moth-trap, a coconut lamp in the middle of a basin of water. But very few moths were captured in this way, possibly owing to the presence of a brilliant moon at the time. This plan should be tried again on moonless nights.

* Specimens have since been received from the Rangalla district.

No. 8.—THE "RED SLUG," *Heterusia cingala*, Moore.

Egg: narrow, elongate, very pale yellow. I have never found the eggs *in situ* in the field, But some moths that were kept in a breeding cage for the purpose of study deposited their eggs loosely on the floor of the cage. It is possible that in nature they are deposited in crevices of the ground at the foot of the plants upon which the caterpillar is to feed. The young larvæ hatch out in four weeks' time.

Caterpillar: broad and comparatively short. Brownish red to bright brick red. With six longitudinal series of small tubercles, on the summits of which are two or three short hairs and one or two pores which secrete a globule of clear viscid fluid, giving a dewy appearance to the living caterpillar. There are the normal number of legs, six on the front and ten on the hinder part of the body. Length of full-grown caterpillar slightly over one inch.

The cocoon is formed in the fold of a leaf. It is tough and closely woven, of a pinkish straw colour. It contains a creamy white chrysalis. Caterpillars that formed their cocoons in my breeding cage on January 2 emerged as moths on the 22nd of the same month.

Moth: fore-wing black with metallic green reflections, with a creamy white patch at the base, a broad creamy white bar just before the middle, and some creamy white spots towards the extremity. Hind-wing peacock blue suffused with black, with a very broad pale primrose-yellow band across the middle, and some yellowish spots towards the extremity. Anterior half of the body peacock blue and black, posterior half bright yellow. In the male the antennæ are broadly, in the female narrowly, feathered. The expanded wings measure 1⅝ inch in the male and 1½ inch in the female.

The moth flies in the daytime, and might easily be mistaken for a butterfly on account of its bright colours. When handled it emits some frothy matter which has a strong pungent smell very like that of the English ladybird beetle. which is thought to afford the insect protection by making it distasteful to birds, &c, I have received reports of injury by this pest from the Pussellawa, Pundalu-oya, and Rangalla districts, and more recently from Passara and Lunugala. On some estates in the latter district the attack appears to have been very severe. Acres of tea bushes were completely defoliated, and the affected fields were said to have looked as if they had been burnt. The caterpillars were observed in large numbers in November, in the following January, and again in April. I have been unable to determine the exact length of the caterpillar stage, but the complete life-history of the insect appears to occupy about ten weeks.

These caterpillars have no stinging hairs, and may be handled without any unpleasant results. They should be collected and destroyed whenever seen, together with the cocoons, and all dead leaves should be swept up from below the bushes and burned.

The caterpillars are fortunately subject to the attacks of a parasitic fly (*Exorista heterusiæ*, Coquillet.) This fly fastens its eggs upon the back of the caterpillar, the young maggots penetrate the body of their host and feed upon its contents, taking care not to touch any vital spot until they are ready to undergo their own transformations. The diseased caterpillar has usually sufficient strength to spin its cocoon, but collapses without turning into a chrysalis. The sudden disappearence of this pest, after reaching its climax is usually due to the work of this useful parasite, though sometimes a bacterial disease is still more effectual in the work of extermination.

BAGWORMS AND FAGGOTWORMS.

These are the larvæ of various species of moths belonging to the family *Psychidæ*. They have all very similar habits, though differing considerably in appearance. The caterpillars construct for them selves cases in which they pass the greater part of

their existence. In fact, the female insect never leaves its case, but lays its eggs and dies inside it. These cases have always a strong foundation of finely woven silk in the form of a tube which closely envelopes the caterpillar, but different species embellish the outsides of their cases in different fashions. Some (*e.g*, *Clania crameri*) arrange small twigs longitudinally all round, till the whole has the appearence of a small faggot of sticks. *Clania variegata* sometimes adopts the faggot form, and at other times uses large pieces of leaf as an outside covering. Another species fastens short lengths of twig side by side in a spiral. Another places the minute sticks transversely, forming a four-sided case. *Psyche minor* adopts a chevaux-de frise pattern of erect fibres and pieces of grass, and occassionally adds some minute snail shells by way of ornament. And a large number of the smaller species have smooth cases partly constructed of minute pieces of bark and lichens. As the caterpillar increases in size, the case is let out from time to time and fresh material worked in. When feeding only the head and front part of the body is extended, the case meanwhile being moored to the leaf by a thin silken cable. At the slightest alarm the head is retracted and a flexible curtain is drawn tightly across the entrance. When the time for its resting stage arrives, the caterpillar firmly anchors the case to a leaf or twig and closes the mouth of the tube with silk. It then turns round inside the case with its head towards the hinder opening of the tube, and changes to a chrysalis in this position. If the insect happens to be a male, it will eventually (in from two to six weeks' time) emerge as a moth, usually of a dull brownish or blackish colour, sometimes with colourless transparent wings. But the female insect does not leave her dwelling. She shuffles off the chrysalis skin inside the case and awaits there the attentions of the male. As the head of the female is next the only available entrance to the tube, and her body being some five or six times as large as that of the male, it follows that her partner must be possessed of a very flexible and extensile organ; and we find that the abdominal segments of the male moth are accordingly capable of very great longitudinal extension to meet the special circumstances. After impregnation the female deposits her eggs—still within the case—and dies. It is said that the young larvæ make their first meal from the dried carcase of their parent. They then emerge into daylight and soon build small tubes for their individual protection.

From the fact that the females are wingless, it is evident that these pests can spread only in the caterpillar stage. It is probable that the very young larvæ are distributed by attaching themselves to the coolies' clothing, or they may be carried for some distance by the wind. Otherwise it would require a very considerable time before a large field could be affected from a given centre.

No. 9.—THE "SMALL BAGWORM," *Psyche* (*Manatha*) *albipes*, Moore.

It is this species that gives the most trouble on tea estates. The caterpillar lives in a conical grayish case, with a few fragments of bark or leaves attached to the outside.

The male moth is dark brown, with white feet (whence the specific name). It has a wing expanse of ¾ inch. The female moth is a whitish, fleshy, grub-like insect, merely a bag of eggs. It remains concealed within its larval case.

This insect has frequently been reported as destructive to tea plants in new clearings in the Kelani Valley districts. After defoliating the plants it does still further mischief by gnawing off the bark. Hand-picking is the only practical remedy. Plants in which the bark has been eaten away must be cut back below the injured part.

No. 10.—THE "LARGE BAGWORM," *Clania variegata* Snell.

This species is sometimes troublesome on local patches, but seldom affects any large acreage.

The caterpillar is enclosed in a bag of grayish silk, to which large pieces of leaves and an occasional twig are often attached. The male insect usually covers its case with pieces of twig, turning itself into a miniature faggot. But the larger-bodied female seems to find the sack-like case the more comfortable form. It remains there till it dies.

The male moth has rather narrow pointed wings, streaked with different shades of brown. Expanse 1½ inch. It is seldom seen, the females being much the more common.

The species occurs commonly throughout the tea districts, and has been reported as defoliating small groups of bushes; but being a large insect it is easily seen, and should be collected and destroyed whenever observed.

No. 11.—THE "TWIG CATERPILLAR," *Boarmia Bhurmitra*, Wlk.

The caterpillar has exactly the appearance of a dry twig when at rest. It belongs to the family of *Geometridæ* or "Loopers,' which have only two pairs of legs at the hinder extremity of the body and progress in a leech-like fashion. When at rest they clasp a branch with these terminal feet and extend the body rigidly, in which position they are almost indistinguishable from a dead twig. The colour of the insect assists the deception, being mottled and streaked in different shades of brown. A full-grown caterpillar measures 1½ inch.

The chrysalis is formed just below the surface of the ground. It is of a reddish colour, smooth and glossy. It remains in this stage for about 14 days.

The moth is very pale brown, minutely specked and spotted with darker markings which form wavy lines across the wings. Expanse from 1½ to 1¾ inch. The moths rest, during the daytime, flattened against a tree trunk or rock, with wings expanded, in which position their colour harmonizes remarkably with their surroundings.

I have been unable to locate the position in which the eggs are deposited.

Although this insect has been observed commonly in Ceylon for a great number of years, it is only within the last month that it has been brought to my notice as an insest pest. Its work on an estate in the Kandy district has now well earned for it this reputation. I was able to pay a personal visit to the place, and found the caterpillars simply swarming on the tea, which they were rapidly defoliating. I was shown a large Grevillea clearing, across half of which the plague of caterpillars had swept. They had stripped these trees bare, together with the young Cardamom plants growing below them, and had treated several Iron-bark Gums in the same manner. On turning up the ground underneath the Grevilleas, the chrysalides were found in large numbers just below the surface. The manager of the property has given me the following history of the pest, as observed by himself. It has been noticed on this particular Grevillea clearing for the previous three years, but to a smaller extent, increasing its area of attack each consecutive year. It usually appears in February and disappears during the rainy season. The pest always starts at the top of the ridge and works downhill, directly against the prevailing wind. In the present year the plague of caterpillars continued well in August, at which time the moths were appearing in thousands, coolies being employed to catch them as they were resting on the bark of the trees. Over 50,000 were said to have been destroyed in this manner in the space of one week, a single cooly bringing in sometimes nearly a thousand moths. The showery weather greatly assisted in the success of this work, as the moths are sluggish at such times and do not readily take wing. The manager was advised to prune the zone of tea upon which the caterpillars were then feeding and to fork lime into the soil with a view to the destruction of the chrysalides. All prunings were to be burned or

buried. At the time of my visit it was noticed that large numbers of the caterpillars were dying, attacked by some fungal disease that had an extraordinarily rapid action. Apparently healthy specimens collected that morning were dead and covered with fungus ten hours later.

The fact that this pest makes its first appearance, each year, on full-grown Grevillea trees will make it difficult to stamp it out at its commencement without sacrificing such trees. The spread of the pest is not due to an actual migration of the caterpillars, but to the fact that the moths move onwards and lay their eggs where there is food for the future larvæ. Between the months of February and July, the period when the pest is usually prevalent, there have probably been three or four distinct generations. It has not yet been determined what becomes of the insects during the rest of the year. This is a point that requires investigation. It is possible that a few individuals carry on the breed. Or it is again possible that eggs laid in July and August may remain dormant until the following February.

There are several other caterpillars that attack and do a certain amount of injury to the tea plant, *e.g*:—

The Tea Borer, *Zeuzera coffeæ*, Nietner
The Cutworm, *Agrotis suffusa*, Hubner.
The Yellow Tussock, *Dasychira*, *horsfieldi*, Saund.
The Small Tussock, *Orgyia postica*. Walker.
The Atlas Moth, *Attacus*, *atlas*, Linn.
The Lobster Caterpillar, *Stauropus alternus* Wal.

But the present circular deals more particularly with those that have been found to occur in such numbers as to seriously affect the crop.

In conclusion, I would again emphasize the importance of being beforehand with the caterpillars. Stamp out the earlier broods before they have time to breed and to extend their area of operation; pluck off all folded and twisted leaves as regularly as "banji" is now removed; and encourage coolies and kanganies to observe and report the earliest appearance of any caterpillars on the tea. Specimens of every caterpillar pest should be sent in to the Entomological Department for identification.

E. ERNEST GREEN,
Government Entomologist.

Royal Botanic Gardens,
Peradeniya, August 15, 1900.

TRANSPLANTING LARGE MANGO-TREES.

Most men have their own particular way of removing and replanting trees of large dimensions, but to those who have not essayed the task this appears a big job to tackle. It is for such persons these remarks are intended. The writer makes no pretensions to a special knowledge of the subject, but having successfully removed and replanted a number of large-sized mango-trees, the method adopted is here given for what it is worth.

Of course, there is a great deal to be taken into consideration to insure success, especially if it be intended that the tree shall retain its foliage. If this is not a consideration, the top may be cut back, and the labour of removing considerably lessened; and thus the risk of losing the tree reduced to a minimum. If the tree is taken from a warm friable soil, and from a secluded position, and replanted in a position having all these favourable conditions reversed, success cannot be expected. If the soil is the only thing that is likely to militate against success, the unsuitable soil may be taken out and good soil be substituted for the reception of the tree. If the tree is removed from where it enjoyed all the moisture it required, and is placed in a dry position, and then neglected, total or partial failure will result. If the last condition is reversed, success is certain. Granted that these, and many other little matters which generally appeal to common reason, are carefully thought out beforehand, the work, instead of being a trouble, will proceed with a fascinating pleasure, and, having succeeded, the man is justly proud of his accomplishment.

A strong box, measuring 30 inches square by 20 inches deep inside measurement, will do for trees having a height of from 8 to 12 feet and a corresponding diameter measure through the top; 10-inch by 1-inch pine boards will do for the sides and ends. The ends of the box will be exactly 30 inches long; the sides will measure just 38 inches long, You will want eight pieces of 3 x 2 hardwood, 20 inches long; two for each corner. The ends of the box must be nailed on to the edge of the hardwood pieces; the sides to the hardwood on their flat, and all flush with the pine. You will observe the ends of the box are nailed to the hardwood on their edges; this brings the thickness to 4 inches at each end, so that, when the ends are put in, this takes up the 8 inches allowed on the sides, making inside measure 30 inches square, and outside 38 inches by 32 inches, with the four corners bolted together on the outside. Having made the sides and ends, stand the two sides up—the hardwood outside— and put in the ends, hardwood outside. This brings all the hardwood pieces flat together, with 1 inch thickness of pine between them. Now cramp the corners together on an even floor, and bore ⅜-holes 5 inches from the top and 5 inches from the bottom, and bolt together; 5½ inches by ⅜-inch bolts will do nicely. When you are nailing the pine to the hardwood, avoid driving nails where the bolt-holes will be, and be sure not to split the hardwood with the nails. Now you have a box without top or bottom as yet. These will be mentioned later on. You need not bolt one end in, as this will have to be done after it is placed around the tree to be taken up.

How the Tree is Taken up.—Place the three sides of the box round the tree, and bolt in the end. See that it is all tightly screwed up, and square it so that the trunk of the tree is in the middle. Now proceed to cut away the soil all round the outside of the box, and, as every 3 or 4 inches are removed, drive down the box with a wooden maul, striking on the hardwood corners. A little judgment will be necessary, as the sole object is to get a solid cube of unbroken soil compressed inside the box. Should you encounter stones that will be in the way of the box going down, they must be carefully taken out. As soon as you uncover a root, cut it clean through with a chisel and mallet, so that the bottom edge of the box does not grind on it as it goes down. If you sever the roots as soon as they are visible, and without removing any more soil, there is a firm bottom to cut on, and less injury will be done to the roots and cube inside the box. Continue cutting away the soil, and driving down the box till it is down level with the surface. (If the soil has been banked up around the tree, it should be removed and made level before the box is placed in position. Even then it may be found necessary to sink the box below the surface to get in all the side roots, but not to the detriment of the surface roots.) You may now nail on the cover, from which it will be necessary to cut out two half-circles to fit the trunk in. Pack some grass or bagging tight between the edge of the boards and the trunk to act as a fender to prevent injury to the bark. Having put on the cover, you may excavate 1 foot deeper all round the box, giving yourself plenty of room and keeping the loose soil well out of your way. Now undermine the box on whichever side you intend to let the tree down (for the tree and box must come down on its side so that the bottom may be nailed on). While you are undermining the box, and before you attempt to let down the tree, see that all the tap-roots are carefully cut through; for if any are left uncut when the tree comes down, they will pull the cube partly through the bottom of the box. This precaution will prevent unnecessary forms of speech and much waste of time.

It will be just as well to prop up the front of the cube to prevent the tree coming down unex-

pectedly. Of course, you see the necessity of clearing away plenty of soil to allow the top of the tree to fall into a hollow space. If this is not done the tree, when down, will lie at an angle which will make it very awkward to trim off the soil and roots. We will suppose the tree, with the cube inside the box, is now lying on its broad side. Then proceed to cut away all the soil that is protruding beyond the bottom edges of the box. Cut the soil off nicely square across, and then whatever roots there are can be sawn off level with the soil The bottom may now be nailed on and the tree up-ended.

If the sun is hot it soon suffers while lying down, for the under surfaces of the leaves are tender and quickly scald. Hence the necessity of getting the tree upright again as expeditiously as possible. Before beginning operations, it will be as well to have a look round to see how near you can get to the tree and which position will be best for getting it into the dray. You will want strong hardwood skids—4 inches by 4 inches by 18 feet long will do. The ends of these may be placed under the box before the tree is up-ended, with the other ends of the skids resting about 18 inches on the dray; :a roller is placed on the bottom of the dray at the ends of the skids, it will land the box well forward with little effort.

The dray must be well propped up fore and aft, and the wheels can be left down into the soil to reduce the incline. If the ruts are dug out the shape of the wheels, it will keep all steady. The soil can be cut away from the front of the wheels when you are ready to start away with the tree. Greasing the skids will help considerably. All lever movements must be made with great steadiness and precaution, especially when the tree is about midway on the skids, for if too much play is allowed, and a gust of wind comes along at the same time, an accident may result. Pieces of 3 by 1 hardwood battens nailed on the bottom flush with the outside edges will keep the box nicely square on the skids while you are levering the tree into the dray, which to the uninitiated looks a dangerous job. These pieces of battens are just as useful to subsequently guide the tree down the skids off the dray.

To Plant the Tree.—Having placed the dray within about 15 feet of the spot where the tree is to be planted, put one end of each skid under the box, the other ends to reach the hole, but to one side of it then slide the box gently down the skids till it reaches the ground. Now turn it over on its broad side with the bottom of the box presented to the hole it is to be planted in, with 2 or 3 inches hanging over. Prise the bottom off with the crowbar, and up-end the tree. This requires small effort, as the top will about balance the box. The tree being now upright in its new home, you can take the nuts off the bolts, and prise the box asunder with the bar. Lift the pieces out, and fill in the hole round the tree. If, when you are prising the box apart, you see the cube of earth is likely to fall to pieces, remove one side only, fill in that side, then take out another, and fill that in till it is all done. If a number of trees are to be shifted, the top and bottom of the box should be bolted together instead of nailing. For this purpose use ½-inch iron rods screwed down 2 inches at each end with nuts and washers to fit. The rods will need to be 24 inches long. The bottom, in this case, should be hardwood, and the battens before mentioned can be parmanently fixed on the outside boards. Whether the top and bottom are nailed or bolted on, it will be necessary to cut the boards longer than the width of the box to allow for any bulging that may possibly occur. If bolts are to be used, the holes should be slotted quite 1 inch long. Now, as the top and bottom cannot be put on at the same time, it will be best to screw on the top, temporarily putting the screws between the slots. The total cost of taking up and eplanting a tree such as shown on the dray (box included), amounted to £2. One man succeeded in doing all the work of the tree on the dray without any help whatever.

[A precisely similar interesting process is adopted in Paris, where very large trees are often transplanted. The French foresters think nothing of transplanting trees 20 to 30 feet high with a corresponding diameter.—Ed. *Q.A.J.*]

ORANGE GROWING IN CALIFORNIA.

To those who are interested in fruit-growing, one of the most interesting sights in one of the two great horticultural tents in the late Paris Exhibition, was the display of fruit staged by the Arlington Heights Fruit Company. If one can believe literally every thing which has been said and written about Riverside "the greatest Orange growing district on earth," this place comes nearest to the earthly paradise of which the mediæval poets and prose writers dreamed and spoke. Its advantages are bewilderingly numerous, and, *inter alia*, "it has no millionaires and no paupers." The delights of Riverside, and the enterprise of the Arlington Heights Fruit Company are duly set forth in a dainty little pamphlet, and when our dear cousins across the water take up the cudgel—in this case it is a pen, we know that they are not going to be unpleasantly modest about their own achievements. The present writer would gladly respond to the "Greeting and invitation from Riverside," but the little pamphlet is silent on the "incidentals" of passage-money and hotel bills! But the facts quoted in the pamphlet are of very great interest, and California is undoubtedly a wonderful country, whilst "Riverside is the exponent and example of the highest development in California—material, moral, social, intellectual." He must be a cantankerous person who wants more than this. Mr. Chauncey M. Depew tells us that a man who owns 30 acres in California is a country gentleman. "He does just about work enough to keep himself in good physical condition and class from 3,000 dollars to 4,000 dollars a year. I know one man who makes 3,000 dollars a year on 10 acres of ground. They press the button, and Nature does the rest."

The orchard area of Riverside is 30 square miles, or 19,200 acres, in which are growing 1,536,000 Orange-trees, so that until some other district can adduce figures in excess of these, the claim of Riverside to be the greatest Orange-growing locality in the world must remain undisputed. These trees planted 20 feet apart, and the produce for this season is estimated at about 318,024,000 Oranges, and the product of this district is stated to be one-third of the output of the State. The money value of this enormous quantity is calculated at 6,000,000 dollars, or an average of over 671 dollars for every man, woman, and child, in the district. Although Oranges are chipped from Riverside every month in the year, the bulk of the crop is exported between Dec. 1 and May 1. Riverside is especially favourable for the cultivation of the Orange for it has all the essential elements of success; an ample water supply, the proper soil, the right altitude, and the absence of fogs. The selling value of Orange (bearing) groves vary from 500 to 2000 dollars per acre. The most favoured variety in the Riverside district—where indeed it may be said to have been raised—is the Riverside Washington Navel, the king of Oranges; it has stood the test of twenty-five years cultivation, and maintains its superiority.

Riverside, in its Magnolia and Victoria Avenues, possesses "two of the most famous avenues in the world;" their combined length is 20 miles, mostly through continuous Orange-groves, and within the limits of the city; whilst in the city park may be seen the largest and finest collection of Cacti in America, "if not in the world." *W. Roberts.—The Gardeners' Chronicle.*

RUBBER TRADE IN BRITISH GUIANA.

With reference to the report on the rubber-trees of the colony, Mr. Quelch said he found on enquiry that a report corresponding in detail to what the Society wanted, was being prepared by Mr. Jenman for the Government, and as it would be possible to secure copies of this report, all he had judged it desirable to do was to prepare a short report merely, which might be distributed in the meantime to those enquiring about rubber-trees. He then read the following report, for which a vote of thanks was passed :—

The rubber trees of the colony may be classed under two heads, namely, those that yield india-rubber proper or caoutchouc, and those that yield balata or guttapercha. In all cases, the product consists of the dried milky juice yielded by the trees when the bark is cut. Technically and economically, the differenees between the two products are very marked, and even in the rough state they are readily distinguished by the character that at ordinary temperatures india-rubber is always highly elastic, while balata is comparatively inelastic. For the collection of both balata and india-rubber in the colony, licences are required to be taken out, and a royalty is charged on the amount collected.

Balata is obtained from the well-known bullet tree (*Mimusops balata*), which occurs widely distributed in the lowlying lands of the colony, more especially in the Berbice, Canje, Mahaicony and Pomeroon districts. The trees reach a height of about 100 feet, and a diameter of from three to four feet, yielding a hard, heavy and durable wood. In general appearance, size for size, they are not unlike the sapodilia trees, to which they are closely related.

To obtain the milk, a series of oblique right and left cuts along the trunk, leading to a central perpendicular channel, is made, to the bottom of which a small clay cup or tin is fastened to catch the milk as it runs. The cuts should be carefully made so as not to damage the tree, and if properly done, they heal up within the space of about four years when the tree may again be tapped As the milk runs but for a short time, the quantity obtained at such bleedings is comparatively small, and it has recently been proposed that the edges of the gashes should be sliced off daily for a few days, by which larger supplies are obtained, care being taken not unduly to drain the tree so as to cause its death. Experiments in Penang on Para rubber trees have shown that by this means larger and larger quantities of milk are obtained for several days, and it is likely that this method is applicable in all cases of rubber production.

The séparation of the rubber from the watery milk is practised in many different ways: as for instance by drying in the sun, by artificial heat, by chemical precipitation, and latterly, it has been proposed, by centrifugal machines. It is claimed that the purest result is obtained by the last method ; but hitherto artificial heat has been chiefly in vogue, and has generally been productive of the most satisfactory results. The balata industry in the colony has been greatly extended recently, more than 330,000 lbs. having been exported last year, though the amount fluctuates considerably from year to year.

Of the native trees yielding india-rubber proper, but little is really known. It is certain that several trees are to be found over the colony generally, of many different species, that yield rubber—presumably of commercial importance—but up to the present, little has been done to exploit this probable source of wealth. From the reports published by Mr. G. S. Jenman, Superintendent, Botanic Gardens, we know three of these rubber plants from which small quantities of rubber have been obtained and examined, but larger quantities are needed before, from a commercial standpoint, they can be compared with the different kinds in the market. These three plants pass under the common names of "Hatie," "Touchpong," and "Macwarrieballi."

The "Hatie" (*Hevea spruceana*) is closely allied to the Para rubber-tree (*Hevea brasiliensis*), and grows in the colony in corresponding situations to its southern representative; that is, in alluvial lands more or less swamped and inundated at high water. The tree grows to a height of from 40 to 60 ft., with a diameter of about twenty inches, straight of trunk among other trees of the forest, but spreading and braneling by the waterside where it is exposed. "The leaves are trifoliate, on long stalks crowded together towards the ends of the branches from between which the flower opens. The leaflets are entire, oblanceolate in shape, acute, polished green above and bluish green beneath. The fruit is a three-cornered capsule with seed of the size of a small nutmeg." The Hatie is common in the upper estuaries of the great rivers and in the various creeks leading therein, but the trees are always more or less scattered, though an abundance of young plants can be obtained in their neighbourhood.

The Touchpong (*Sapium biglandulosum*) appears to be a common tree both on the high lands of the interior and on the lowlands of the coast. Examples are met with in many parts of Georgetown where they are known by the common name of gum-tree. It is closely related to the Jamaica milk-wood or gum tree, and grows to a larger size even than the bullet-tree. It will readily be recognised by its broadly lanceolate, entire leaves, of from 5 to 9 inches in length, with two glandular spots, on one each side of the short stalk at the base.

The Macwarrieballi (*Forsteronia gracilis*) is one of the bush-ropes of the interior, where it appears to thrive in the more rocky and gravelly places. Mr. Jenman found it on the high ground near the Great Falls, Demerara River. It is closely allied to the milk-withe of Jamaica, and like that plant appears to produce excellent rubber. Being of comparatively small size, about 4 inches in diameter, the stem yields only a small amount of milk, but the milk is extremely abundant in relation to the size of plant.

Besides these three species, others such as the kumakaballi and the cow-tree are also known to be rubber-yielding, and in fact experiments are in course of completion at the Botanic Gardens for the identification of other species and their establishment in cultivation.

That foreign species of rubber trees can easily be established in the colony, is evident from experiments in plantations in Ceylon, Penang, and other parts of the world ; but seeing that one of our native forms is so closely allied to the Brazilian plant that is noted for the production of the best rubber, it would seem to be worthy of enquiry whether our own species is not equally valuable. The subject certainly deserves serious consideration.—*Timehri*.

DRAINAGE OF LAND.

Too much attention cannot be paid to this subject. Artificial draining is the primary part of successful agriculture, and even in the early days of Rome, the draining of land was extensively carried on.

HOW TO KNOW WHEN DRAINING IS NECESSARY.

1.—Whenever after rain water remains in the furrows or stump holes.

2.—When the soil sticks to your shoes or horses' feet and farm tools.

3.—Whenever you see water in the footprints of a horse or other animals.

4.—When animals sink deeply into the soil.

5.—When the rays of the sun form a hard crust on the soil.

6.—Whenever after heavy rain the little holes in the ground show more water in them than in other parts.

7.—If after rain a stick is put into the ground and taken out, water will rise in the hole.

8.—If crops will grow better when land is gathered up into small ridges

In the first place we get rid of the stagnant water, both on the surface and below it. Stagnant water has an injurious effect on vegetation, it is deprived of its oxygen, and while it remains in the soil it prevents fresh water from taking its place. Water held in suspension is detrimental to plant life and must be kept moving, it also opens the soil and lets the air in after it. The theory of draining is well illustrated by a flower-pot with a hole in the bottom, the water will either give life or death to the plant; it gives life when it can pass through the pot, but plug the bottom up and let the water stop, and death is the result.

SOME BENEFITS TO BE DERIVED FROM DRAINING LANDS.

1.—Draining removes stagnant water from the surface and subsoil.

2.—It lengthens the season, well-drained land can be worked much sooner after rain.

3—It deepens the soil.

4—It warms the soil by stopping evaporation.

5—It equalises the temperature of the soil.

6—It carries down soluble substances to the roots of the plants.

7—It prevents injury from drought and wet.

8—It improves the quality and quantity of the crops.

9.—It increases the effect of the manures.

10.—It prevents the heaving of the soil.

11—It helps to prevent disease in plants.

12—It increases the general health of the locality.

A good soil, with a gravel subsoil, need not be drained, but with a stiff clay subsoil it is necessary. The deeper the drains are the further apart they may be placed. Before commencing to lay down a system of drains; an outlet for the main drain must be found, and the drains marked out so as to give the necessary fall, a fall of 3ins. in a 100ft. will be sufficient, the bottom of the drain must be kept smooth and must be carefully graded. Care must be taken to avoid, if possible, bringing the subsidiary drains in at right angles to the main drain, as this impedes the flow of water at every junction. The main drain should be made amply large enough to carry off the water from all feeders. Great difference of opinion exists as to the depths of drains, they vary from 1½ft, to 6ft., much depends on the nature of the soil, retentive soils require deep drainage, the deeper the drains the wider they may be apart—*Journal of the Jamaica Agricultural Society.*

PLANTING NOTES.

MR. J. H. BURKILL, an assistant in the Herbarium at Kew, and formerly in that at Cambridge, has been appointed assistant to Dr. Watt, the Reporter of Economic Products, Department of Agriculture, in Calcutta, and will leave this country in January next.—*Gardeners' Chronicle.*

LARGE SHIPMENT OF APPLES.—We learn from Boston, U.S.A., that some two or three weeks since the largest shipment of Apples on record was made from that port for Liverpool. This shipment consisted of 28,285 barrels of all the best varieties suited for the Christmas market. —*Ibid.*

LINNEAN SOCIETY.—On the occasion of the evening meeting held on Thursday, December 20, 1900, at 8 p.m., the following papers will be read: 1. "On the Structure and Habits of the Ammocharides," by Mr. Arnold T. Watson, F.L.S., &c. 2. "The Flora of Vavau, one of the Tonga Islands," by Mr. T. H. Burkill, M.A., F.L.S. 3. "Warning Colours in Insects," by Prof. E. B. Poulton, M.A., F.R.S., F.L.S.—*Ibid.*

A WONDERFUL IRIS.—Mr. Peter Barr writes to us from Victoria, regarding a new German Iris staged by Miss Love at a local show:— "Those who visited the Tatura Show on Wednesday, October 17, must have seen Iris Painted Beauty. It was conspicuous in the fine, but crowded, box of cut flowers staged by Miss Love, of Tatura, and was, during the day, the cynosure of the exhibits. Its beauty was of a very exceptional, marked, and distinct character. An expert gave it as his opinion that no Iris of so much refined beauty had ever before been seen in this or any other country. It belongs to the group commonly known as German Iris. The flower is pure white.—*Ibid.*

"FROSTING" SHRUBS.—Your correspondent, "W. C.," will find the following method satisfactory if carefully followed out. Procure a tub or pail according to the size of the shrubs or branches to be treated, put in enough whiting and water to make it of the consistency of paint, then add enough liquid-size to make it adhesive —about a pint to a pailful of mixture; well stir it together, and keep it stirred while using. Having the shrubs ready at hand, dip them in the mixture, then let the superfluous stuff run off; having ready a flower-dredger containing "Jack Frost Powder" (which can be purchased at any good fancy shop), and sprinkle the shrubs there with while moist; let the dressing dry gradually, and keep them in a dry place till wanted. Small pieces of the common Gorse dressed in this way, and placed in pots or dishes with a groundwork of small Ferns and moss, make a striking contrast to small Codiæums and Cocos Palms for the decoration of the dinner-table for the Christmas season.—A. S. COLE, Moncreiffe Gardens, Bridge of Earn, N.B.—*Ibid.*

THE CHARDUAR RUBBER PLANTATION, ASSAM.

RESULTS OF TAPPING.

Mr. J A McKee, Conservator or Forests, Assam, has recently published a report giving the results of tapping operations carried out in compartments 3. 4, 5, 6, 7 and 8, etc., of the Charduar Rubber Plantation in the past season of 1899-1900.

AREA AND OUTTURN.

2. An area of 474 acres, containing 6 810 trees, was worked over, yielding 4,502 lb. of clean and dry rubber, as per detail below, and it should be noted that the trees in compartments 3 and 4 were tapped for the second year in succession, having been also operated on in 1898-99:—

		Acres.	Trees.	Clean rubber yielded. lb.
Compartment	3 ...	1·66	25	24
Do.	4 ...	94·31	1,499	863
Do.	5 ...	126·84	1,849	1,176
Do.	6 ...	77·25	1,116	889
Do.	7 ...	80·39	1,060	833
Do.	8 ...	73·73	980	657
Roadside trees	...	20·00	281	60
Total	...	474·18	6,810	4,502

COMPARISON WITH THE PREVIOUS SEASON'S OUTTURN.

3. The above figures give an average outturn of 9·5 lb. of clean rubber per acre and ·66 of a pound of elean rubber per tree. In the previous year, the figures of outturn were very similar, being 9·4 lb. per acre and ·52 of a pound per tree, the outturn per trec being reduced by the Bomani Hill Plantation containing 8 acres, in which the trees are planted much more densely, and are, therefore, smaller than at Charduar, the aetual density being 92 trees per acre in the former compared with only 14 per acre in the latter. It is, however, noteworthy that the Bomani Hill area yielded 9·5 lb. of clean rubber per acre, or about the same quantity as the average outturn for the whole area of 322 acres worked over in the season of 1898-99—a fact which tends to prove (the trees being of equal age) that a densely-planted arca does not yield more rubber than one sparsely planted—while, on the other hand, it must have cost more to plant out originally and to establish as a going concern —see also remarks in paragraph 15.

OUTTURN OF TREES TAPPED TWO SEASONS IN SUCCESSION.

4. Compartments 3 and 4, which were tapped for the second season in succession, yielded practically the same outturn as in the previous year, the figures for compartment 4, containing 1,499 trees, being ·60 and ·58 of a pound of clean rubber per tree for the first and second year respectively, while the few trees (25) tapped in eompartment 3 this last season yielded ·96 of a pound per tree, as compared with ·70 of a pound per tree obtained from the entire compartment in the past year, the greater outturn this season being doubtless altogether due to the fact that the trees operated on were specially selected ones.

METHOD OF TAPPING: DIFFERENT TOOLS USED.

5. Mr. Copeland, the Deputy Conservator of Forests, under whose careful personal superintendenee and management all the operations were

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carried out, reports that tapping was commenced in the first week in December, or six weeks carlier than in 1898, the object being to escape the rain, which, however, does not seem to have been effective, rain having fallen off and on during the whole tapping period. It is also reported that three different tools were employed on the work, compartments 6, 7 and 8 being tapped by Nepalese and Assamese, in the old and usual manner, with *kukris* and *dhaos*, whereas compartments 3, 4 and 5 were tapped by Garos with half-inch carpenters' gouges introduced for the first time as an experiment. The gouge was worked with a small mallet and is reported to be the best of the three methods, as it does not damage the tree so much as the *dhao* or *kukri*, shallow wounds, only bark-deep, being made, instead of the deeply incised and jagged wounds caused by the last-mentioned tools. In this connection, it is important to remember that the rubber cells are located in the inner bark layers, and that to obtain the *latex* flow, it is unnecessary to wound any portion of the cambium. It is, therefore, expedient that the tapping tool employed should be capable of being controlled and guided to a greater extent than is practicable with a *dhao* or *kukri*, which can be used only with a forcible, and, oftener than not, a damaging cut.

6. The plantation was inspected by the Conservator as recently as the 13th of the present month, when it was observed that bark was already forming over the gouge cuts, that is to say, within eight months of the tapping operations, and it seems safe to predict that these kinds of wounds will be thoroughly healed twelve months after their first infliction. The *dhao* cuts, on the other hand, take longer to heal, and compartments 1 and 2 that were tapped in January 1899, are only now recovering from the operation. Roughly speaking, it may be stated that these kinds of cuts take six months longer to heal than those made with the gouge.

COMPARISON OF RAW OUTTURN OBTAINED BY DIFFERENT TOOLS.

7. The outturn of raw, uncleaned rubber obtained by the different methods was slightly in favour of the *dhao* and *kukri*, compartments, 6, 7 and 8 yielding ·79 of a pound per tree, as compared with ·65 of a pound per tree yielded by compartments 3, 4 and 5. But the slight difference of outturn in favour of the *dhao* is more than counterbalanced by the greater damage caused to the trees. while it is reported by Mr. Copeland that the loss in weight caused by the extraction of foreign matters is in favour of the gouge—the actual ratio based on the results of carefully weighing the first two days' tappings being as three to 5. Unfortunately, the clean rubber obtained from the different compartments was subsequently not kept separate, when it became impossible to correctly differentiate between the clean outturn resulting from the use of the different tools, and the figures exhibited under this head in Statement A attached are considered to show results too favourable to compartments 6, 7 and 8, at the expense of compartments 3, 4 and 5.

NEW TOOL RECENTLY DESIGNED.

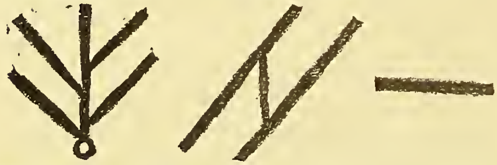
8. In this connection it may be noted that, with the help of Messrs. Ahmuty & Co., Calcutta, a new kind of gouge has lately been made, which promises to turn out better for the work than either of those above mentioned.

LOSS OF WEIGHT BY INTERMIXTURE OF FOREIGN MATTERS, &c.

9. Considering the figures relating to loss of weight, owing to cleaning and drying, as a whole, it would appear that, on the raw material as first collected, this loss came to about 5½ per cent—a proportion which compares favourably with the results of the previous year, when this form of wastage amounted to as much as 9 per cent, and which proves that some factor was present in the season's operations which tended to raise the quality of the raw outturn obtained.

DIRECTION IN WHICH CUTS SHOULD BE MADE.

10. The cuts were made horizontal or only slightly oblique, it being noticed that the wounds bled in proportion to their horizontal direction, and that any considerable deviation from this direction resulted in a slower and reduced flow of rubber. Experiments on untapped trees were made personally by the Conservator with the view of testing this point, arrow-shaped (the Brazilian method), oblique, as well as horizontal cuts being made, when it



was very apparent that the *latex* flowed far more freely from the last kind than from either of the others. No examination of the bark or bast has yet been made to test the cause of this observed fact, which is not in agreement, it is believed, with experiments made elsewhere on rubber-yielding trees and plants of other species.* But an enquiry will be instituted with the help of Dr. Watts, the Government Economic Reporter and the Director of the Forest School, with the view of obtaining information on the point. In the meantime, it seems safe to hazard the opinion that the rubber cells must be placed in more or less vertical rows, and that, in fact, in arrangement they resemble somewhat an arterial system, when it will be readily understood why a horizontal cut must be much more effective in tapping their contents than a vertical or oblique cut of equal length.

RUBBER RESIDUUM AND WASTAGE DISCUSSED.

11.—Another point was tested at the same time by the Conservator, which perhaps helped to create the opinion that the tapping operations, as performed in 1898-99, were of an unnecessarily careless or wasteful nature. Allusion is here made to the fact that, when the rubber is stripped from the cuts, a milky, and sometimes copious, residuum runs out of the wounds down the tree, and as no arrangement is made to collect this overflow, the impression may have been carried away that it represented wastage. But the Conservator was able to prove to his satisfaction that this residuum, which closely resembles rubber-milk in appearance, contains no caoutchouc, and is capable of being practically absorbed by blotting paper or of being evaporated in the sun. In fact, it consists practically of little else than water and contributes no appreciable proportion of the true wastage, which seems to be wholly represented by that portion of the *latex* which spurts out of the wound during the actual process of tapping and overflows on to the trunk or branches of the tree, or is sprinkled or drips on to leaves or undergrowth at its base. But all this apparent wastage is carefully collected and cleaned, and although it sells at a greatly reduced rate in the London market, the proportion it represents to the quantity of clean, good material collected is not of any great importance. This last season, this particular kind of rubber amounted to 128 lb. weight out of a total 4,5 2 lb. of clean material obtained, or rather less than 4 per cent; and it was sold separately in London at 1s 10d instead of 3s 7d per lb, which is equivalent to a gross loss (excluding charges) of R165 on a possible R10,844, or about 1½ per cent.

FINANCIAL RESULTS ON RUBBER SOLD IN LONDON. 12.—The financial results of the operation were decidedly, satisfactory as will be seen from the following figures :—

	£	s.	d.
4,323 lb. of clean rubber (reduced in London to 4,280 lb.) were sold at 3s 7d per lb.	766	16	8
128 lb. of ground rubber (reduced in London to 122 lb.) were sold in London at 1s 10d per lb.	11	3	8
Add—Interest, 7 days on £201-5-0	0	3	10
Total receipts	778	4	2
Deduct—London charges, including freight from Calcutta	59	17	11
	718	6	1
	Rs.	a.	p.
Equivalent at exchange of day	10,732	12	3
Deduct—Calcutta charges	52	15	9
	10,679	12	6
Deduct—For plantation charges, tapping, cleaning, packing, freight to Calcutta, etc.	3,839	2	0
Net profit	6,840	10	6

A net profit, therefore, after deducting all charges, of R6,840 10-6 was realised on the 4,451 lb. of good and inferior rubber despatched to England from the Plantation, which is equivalent to R122-15 3 per maund of 80 lb. or Re 1-8-7 per pound as compared with Re 1-2-3 per pound realised last year.

OTHER RUBBER. 13.—Besides the above rubber sent to England for sale, a balance of 51 lb. was disposed of in the following manner, which will make up the total 4,502 lb. obtained from the season's tapping operations—see paragraph 2—

Sent to	Reporter on Economic Products, Calcutta	10
Do	Agricultural Chemist, Dehra Dun	2
Do	Curator, Government Garden, Nilgiris	½
Do	Ranger Venkatramana, Forest Department, Madras ..	1
Sold locally for R51-8-0	..	35½
Kept as sample in stock	..	2
		51

TAPPING CHARGES AND BROKER'S REPORT ON QUALITY OF RUBBER. 14.—Full details of all figures discussed above will be found in Statement A attached to this report, and in this connection it only seems necessary to draw attention to two more points, *viz.*, the reduced expenditure effected on tapping operations and the favourable report of the London Broker on the quality of the

* Vide *Indian Forester*, XXVI., page 317.

rubber forwarded for sale. In regard to the first point, it should be noted that, in the previous season, an item of R1,198 was incurred on the purchase of coal tar for smearing over the wounds caused by the *kukris* and *dhaos*, partly as a healing application, but chiefly as a preventive or check on illicit tapping that might subsequently be made on the trees that had been worked over departmentally. This last season no expenditure has been incurred under this head, as it seems doubtful that the application of tar is of any utility and the danger of illicit tapping is not considered sufficiently great to justify the considerable expenditure above mentioned. By eliminating this part of the original procedure, and by reducing the actual expense of tapping, the cost on the material landed in Calcutta was reduced from R94 to R70 per maund of 80 lb., the actual figures being as follows :—

Cost of 3,363 lb. of rubber obtained in 1898 99 R3,967
Do 4,502 lb. do do in 1899-1900 3,839

With regard to the second point mentioned above, Messrs. McLeod & Co. of Calcutta, through whose firm the rubber was despatched to London and sold, write as follows :—

"People who have examined our parcel inform us that it is the finest stuff ever seen here from Assam. Last year's shipment could scarcely be improved upon in matter of cleanness and condition, but this parcel is more presentable, the packing being better done."

Doubtless, the better packing in *acme* tea boxes lined with cloth, instead of despatching the product in bags, as was done in the previous season, had much to do with the better price paid, 3s 7d per pound having been realised as against 3s 4½d in 1899.

SUPPLEMENTARY EXPERIMENTS.

15. In a Statement B, which is not here reproduced, Mr. McKee gives a detail of the girth and crown or spread measurements of 10 per cent of the trees that were tapped last season. The results are interesting so far as they go, and tend to prove, as might be expected, that the outturn of rubber is in proportion to the spread of the trees. Abstracted, the figures give the following results :—

Number of compartments.	Total number of trees measured.	Total girth measurements.	Total crown measurements. Maximum diameter.	Total yield of rubber of measured trees, in tolas.	Remarks.	
		Ft.	Ft.			
1	2	3	4	5	6	
					Spread per tree.	Outturn per tree.
						tolas
4	100	1,064	6,416	3,362	64' ...	33¼ = ·83 of a lb.
5	162	1,446	9,844	5,414	61' ...	33½ = ·83 ,,
6	95	703	6,035	3,896	63' ...	41 = 1·00 ,,
7	96	649	5,815	3,769	61' ...	39 = ·97 ,,
8	97	475	4,487	2,281	58' ...	29½ = ·73 ,,

The girth measurements of the trees are so difficult of being made in a uniform manner, owing to air roots which form supplementary stems having a tendency to anastomose, that the figures under this head may be ignored ; but if the figures relating to the average spread, of trees in the different compartments are compared and it is borne in mind that the trees in compartment 4 were tapped for the second year in succession, it seems that, as above stated, the largest outturn is obtained from the trees having the best and widest crowns.

RESULT OF TAPPING TREES THREE YEARS IN SUCCESSION.

16. Another interesting statement is that attached to this report as Appendix C, which shows the result of tapping 21 good selected trees in compartments 2 and 3 for three years in succession, 1896-97, 1897-98, and 1898-99. This experiment should have been commented on in last year's report, but seems to have escaped observation. Abstracted, the results were as follows :—

Number of trees.	Yield in lbs.		
	1896-97.	1897-98.	1898-99.
21 ..	46	48	9

and they seem to prove that, although the first two years' operations will yield nearly equal outturns—agreeing in this with the figures quoted in paragraph 3 for compartments as a whole—there then, in the third year, comes a terrible falling off of 75 per cent. And as the trees in question, for the most part, are specially good specimens, and, in fact, are the dominant trees in compartments 2 and 3, the experiment should warn us to be very careful in working over the plantation too frequently, in successive years, without giving the trees sufficient time for recuperating from their former tappings. The figures also prove that the small quantity of rubber yielded per tree by our tappings must be considered the maximum that can safely be extracted from them at present. Mr. Home's estimate of 2 lb. per tree made when forecasting the outturn of 1898-99 was evidently of too sanguine a nature for the compartments as a whole.

FUTURE OPERATIONS.

17. With the meagre information as yet at our disposal, it is not safe to arrange for work more than one year in advance. Next season, therefore, it is proposed to tap compartment 4 for the third year in succession, with the object of verifying, in a more decisive manner, the results obtained from the limited experiment mentioned in paragraph 16 and recorded in the attached Statement C. But should the results of tapping the first 100 trees of this compartment show conclusively that the outturn is much smaller than on previous occasions, the work in this area will at once be stopped. In addition, compartments 9, 10 and 11 of the Charduar Plantation, containing 251 acres and 3,490 trees, and the eastern block of the Khulsi Plantation, containing 88 acres and 2,400 trees, will be tapped for the first time. The Charduar trees will be 19 and 20 years old and those at Khulsi 23 years old, and it expected that they will yield, at the rate of 9 lb. per acre, a total of 3,051 lb. of clean rubber fit for despatch to London. Subsequent operations should be guided greatly by the result of tapping compartment 4 for the third year in succession. If the outturn is poor, it will, I think, prove that, in the present condition and age of the plantation, it is only less wrong to tap the trees two years than three years in succession, and the practice should be discontinued. As a tentative measure, under these circumstances, three years' rest should be

allowed to each area after having being tapped over. On the other hand, if no bad results follow, the re-tapping of No. 4, compartments 1, 2 and 3 that were last tapped in 1898-99 may be again operated on in 1901-1909, as well as compartment 4 for the fourth year in succession.

CONCLUSION.

18. In conclusion, the following deductions have been made from the points brought out by the figures and observations discussed in the above report. In some cases these observations still require more proof before they can be formulated as rules for the guidance of future operations; but it seems convenient and likely to be useful to attempt such deductions as a means of attaining steadily, if gradually, to a correct method of plantation management:—

(1) That in the present condition of the plantation, only about 9½ lb. of clean rubber per acre can be safely extracted from the trees at one tapping (see paragraph 16).

(2) That a densely-planted area does not necessarily yield more rubber per acre than an area of the same age in which the trees are relatively much fewer (see paragraph 3).

(3) That the out-turn of a tree in rubber seems to be in proportion to its crown or lateral spread (see paragraph 15).

(4) That a carpenter's gouge or a modification of this tool is best adapted for tapping, as it does less damage to the trees than the *dhao* or *kukri*, and enables the rubber to be collected with a smaller intermixture of foreign matters and dirt (see paragraph 5, 6 and 7).

(5) That only horizontal cuts should be made during the tapping process, as neither oblique nor vertical cuts yield the same quantity of rubber (see paragraph 10).

(6) That the expensive application of tar to the wounded trees is not justified by any commensurate result, and may be discontinued (see paragraph 14).

(7) That so far as experiments have been made, there are grounds for believing that the trees cannot be tapped three years in succession without showing signs of exhaustion, and that if this is proved to be correct, it is also probably only less wrong to tap the trees two years in succession (see paragraph 16 and Statement C).

(8) That neat and careful packing has an important effect on the selling price obtained for the rubber in the London market (see paragraph 14).

	R.	a.	p.
Packing, weighing and cost of Acme chests, etc.	78	7	7
Carriage from Plantation to Tezpur	12	8	0
Steamer freight, Tezpur to Calcutta	159	9	0
Erection and repair of camp huts ..	243	14	0
Clearing jungle and making paths for Inspection	909	4	0
Measuring girth and crown and labelling trees	420	5	5
Purchase of, and making, gouge ..	66	12	0
Miscellaneous	206	3	0
	2,116	15	0
Add—As per statement, cost of tapping and collection and cleaning of the rubber	1,722	3	0
Total ..	3,839	2	0

Add—On account of Agents' charges:—

	£	s.	d.			
Printing, advertising and sale expenses ..	0	2	6			
Freight ..	6	19	7			
Wharf charges ..	4	19	4			
Brokerage ...	3	17	9			
Fire Insurance ..	0	15	6			
Postage and petties ..	0	7	6			
Agency and Superintendence, London and Calcutta	23	6	9			
	40	8	11 =	604	5	2
	R	a.	p.			
Calcutta charges:—						
Shipping ..	11	2	0			
Insurance ...	33	1	9			
Stamps and postage ..	8	12	0	52	15	9
Total ..				4,496	6	11
	£	s.	d.			
Gross amount of sale of 4,323 lb. of clean rubber (reduced in London to 4,280 lb.) at 3s 7d per lb.	766	16	8			
Gross amount of 128 lb. of ground rubber (reduced in London to 122 lb.) at 1s 10d per lb.	11	3	8			
Add interest for seven days of £201-5 ..	0	3	10			
	778	4	2			
Deduct—Discount at 2½ per cent ..	19	9	0			
	758	15	2 =	11,337	1	5
Deduct—Total expenditure as above				4,496	6	11
Net profit on 4,451 lb. of rubber ..				6,840	10	6
Do per lb.				1	8	7

—*Indian Forester.*

THE VALUTATION OF RAW RUBBER.

BY H. L. TERRY, F.I.C.

Probably there is no other body of similar importance or intrinsic value which is bought and sold on less scientific lines than is india rubber in its various qualities, and it can be asserted with confidence that in the case of no other regular article of merchandise has less progress been made in the way of putting the sale and purchase on a scientific rather than "rule of thumb" basis. Not that there is anything to be wondered at in this when we consider all the facts, the problem to be solved being undeniably one of considerable perplexity, but all the same, seeing the progress that has been made with regard to putting the sale of other organic products on a scientific basis, it might have been supposed that something would have been attempted in the case of rubber. As my present title may lead the reader to imagine that I am here about to propose some scheme to effect the desired result, I may as well put in a disclaimer at once, my present effort being limited to a few casual remarks on the subject generally, though it is hoped that such remarks may not be entirely without interest, even if their perusal fails to throw a gleam of light into the gloom that still surrounds the matter in the minds of those who are more competent to hold forth on it than I am myself. In using the term rules of-thumb, I do not wish to be understood as doing so in a derogatory spirit, because, even if the case is not similar in all trades, there is no doubt that the practical man who uses his senses of sight, smell and touch is in the rubber trade often superior to the scientist. For an opinion of value on many rubber products it is much

safer to consult a foreman of long experience with the particular class of goods concerned, than it is to refer to the scientific man unless the latter, which is not always the case, has studied the manufacture closely in the works. And this seems to hold just as strongly with the raw rubber; at the present time this is bought by the practical man who employes his senses alone and extreme caution should be evinced by those who say that this position of affairs is all wrong, and that rubber should be bought and sold on chemical analysis.

Now, as regards chemical analysis, everything depends upon the sampling. Unscrupulous mining agents can get any result they wish from a gold reef by omitting to work upon a really average sample for their assays. This sampling is a matter really of great complexity and occupies a considerable amount of time, but its importance cannot be exaggerated. At the Rio Tinto copper and sulphur mines in Spain, the sampling, in order to get a representative assay, is carried out in a very comprehensive manner, the company priding themselves on the effectiveness of the system which they have worked out. With rubber, the case is very similar unless a really average sample were taken from bulk, the results of the chemical analysis, say the determination of dirt, water and resin, might easily be very misleading. No doubt, with proper methods, an average sample could be obtained, but at what cost of time and labour? Rubber is much more difficult to work than is the case with the general run of minerals, and where time enters largely into the question, the difficulties, in my opinion at least, in the way of getting an accurate valuation of a few tons of African ball rubber would be found practically insurmountable. In some cases where the quality is pretty uniform, the chemical method might prove of utility, but we have to remember that uniformity is the exception rather than the rule, so we must base our calculations accordingly. It certainly seems desirable that some agreement could be come to between dealers and buyers as to the amount of water in raw rubber; at present, where the amount of water varies to such an extent, it is rather like buying a pig in a poke. The subject has before now come up for discussion in the correspondence columns of this journal, but I do not remember that anything definite was come to. Not so long ago I remember reading of a case in London, in which a rubber firm made a claim for loss of weight, the difference between the weight invoiced and that actually delivered being accounted for by the water which had percolated the cask. I forget how the claim resulted, but the point is an important one. If some arrangement could be come to with the exporters to send the rubber on board ship with a maximum of, say 10 per cent. of water, there would be an advantage in freight charges, and it would certainly prove an easier matter for the purchaser in England to arrive at the value of the shipment. As the case stands at present, the commoner qualities of rubber are bought in a rather speculative way, and it becomes of importance for the management of the works to estimate their value for the several purposes to which it is intended to put them. Now, here considerable progress has been made compared with former years, though it must be confessed that the very elaborate methods of testing which have been worked out at some of the German works have not commended themselves to the trade as a whole, the suspicion having gained ground that unless you have a scientific staff employed at a low rate of remuneration the time and trouble involved in carrying out the tests are not justified on the score of expediency. It may not be without interest to give a few details of the testing system, as carried out, or said to be carried out regularly at one of the largest German rubber works. The apparatus employed is very similar to that used in testing textiles or metals; that is, a weighing machine. to which is attached an iron rod with a grip, and at the other end an iron rod with a grip, worked by a cog-wheel, as in the ordinary lifting jacks. This explanation may not be particularly clear, but it is difficult to describe machinery in a few words or without the advantatious aid of diagrams. Fine Para is taken as the standard, and its stretching power and resistance to rupture ascertained, and a series of comparative tests are made with other rubbers, in which way it can be ascertained whether a particular rubber tested is not too dear, compared with Para reduced to the same standard. For instance, when the rubber tested is found to be 35 per cent. under the quality of Fine Para, while its price is only 25 per cent. under, an indication of moment is obtained. For mill purposes, a table is made showing the stretching and resistance to rupture of the various compounds and is referred to on occasions when it is proposed to alter the composition of the mixings. In this way it is found possible to avoid any variation in the quality of the goods, moreover, these tests, it is said, have proved useful in the case of claims brought against the firm for supposed defective work. This brief account of what is done in some quarters in Germany will suffice for the present occasion; it is a good illustration of the scientific bent of the German mind, and in this case, there is every reason to suppose that advantage accrues from its adoption. The German passion for detail, however, is not always justified by results, and the Englishman is apt to treat its excesses with but scant respect. I am open to correction in the matter, but I do not think that the German method of testing rubber finds its counterpart in England, though I am not at all inclined to say that it could not be introduced into our works with advantage. Some years ago I adopted a comparative method of testing the value of washed raw rubbers, depending on the melting points. Naturally the rubber which contains the most resinous constituents melts the soonest, and the relation between tensile strength and melting point is a very close one. The table which I made naturally commenced with Para and ended with African Flake, the other brands of rubber taking up their positions at intermediate stages. In this way, by strict attention to details of time, best results of value can be obtained, showing not only the difference which exists between the various brands of rubber, but also to what all extent variations occur in the tensile strength of rubber which is always sold under one name, and which is commonly supposed to be of uniform quality. There is no doubt that failure to recognise the differences existing in the quality of rubber is a fruitful source of trouble, because it leads to incorrect vulcanisation. Especially is this likely to be the case where the goods are submitted to mechanical tests of great stringency, as, for instance, in the case of buffers for certain of our railway companies, and it is a fair presumption that trouble which has occured in the past might have been obviated if the rubber, previous to mixing, had been put through some sort of test, such as indicated above, to enable an opinion to be arrived at with regard to its axact quality. In the absence of such testing, there must always be an element of chance about the results of vulcanised mechanical rubbers as regards the important particular of tensile strength, and when trouble arises it is rather too much the tendency to put the blame on some workman or other, whereas it is more probable that the real cause lies in the failure of the workman's superior to recognise that the time of vulcanisation, or the percentage of sulphur might have been altered with advantage. However it may be said that here I am somewhat transcending the limits of my subject, though it is always permissible when advocating a change of policy or procedure to state clearly in what direction benefits may be expected to accrue from the innovation. The subject as referred to above, is clearly seen to come under two heads, which have little in common, viz: the testing of raw rubber before purchase, and the test-

ing by mechanical means, of the purchased rubber to ascertain its fitness for particular purposes. At the present time, there does not seem much prospect of any improvement heing effected in the first case; in the second case, however, it seems of moment that rubber manufacturers should seriously ask themselves the question as to whether the time and trouble which are devoted to the matter in Continental works are justified or not hy results. It is a question which cannot be answered offhand, hut only in the light of results, and I am not in a position to give what may purport to be a decided opinion one way or the other. I may, however, hy way of commentary, remark that the tronble involved, to say nothing of the capital outlay on testing machines, should be in proportion to to the output of the factory in the class of goods which the tests are ment to benefit; in other words as the same emount of time and trouble in testing would be necessiated for the filling of a small order by a small factory, as in the case of a Government or railway contract hy one of our largest manufacturers what would be justifiable in the latter case might not be so in the former, as the expense incurred would not bear proportionately on the cost of production. There are other points, of course, that call for consideration, but the limits of space preclude my saying more on the present occasion, so I lay aside my pen with the hope that these remarks may severe as an incentive for some more competent writer to give the journal the benefit of his views on the subject.

THE GARTON LECTURES ON COLONIAL AND INDIAN AGRICULTURE.

PROFESSOR WALLACE.

The Inaugural Address on Famine in India.

INDIA AND CEYLON.

Introduction.—General view of Agricultnre of India, including the main features of the Presidencies and other great political divisions—Bombay, Madras Central and North-West Provinces, Punjab, Bengal, Assam, Burmah, and Ceylon—with special reference to Geology, Soil, Irrigation, Climate, Peoples, Famines and Chief products.

Tillage Implements.—Indian Ploughs, Native Harrows, Hoes, Seed-drills, and Hand Implements. European Implements and their suitability or unsnitability to Indian conditions.

Cultivation and Crops.—Rotations and Mixtures. Tillage before and after sowing. Seed and sowing. Harvesting and preparation for market. Commercial uses. Diseases and Injuries. Classification of Crops into Cereals, Pulses, Oil Seeds, Fibre, Fodder and Miscellaneous Crops, with special reference to the production of Wheat, Barley, Rice (Paddy), Maize, Millets (*Juar Bajra* and *Ragi*), and Sorghum—Gram Horse-Gram, Lentil, Pea, Ground Nut, Rape, Linseed Caster-cil Plant, Sesamum—Cotton, Jute, Ramei, and Hemp—Lucerne and Guinea Grass, Sugar-cane, Tobacco, Cinchona, Tea, Coffee, Indigo, Poppy—the commoner valuable Grasses of India, and their cultivation as practised at the Allahabad Grass Farm and other milstary stations in Northern India—Grass Cntting—Haymaking—Silage.

Irrigation,—Land and other conditions snitable and unsuitable for irrigation. Location and relative advantages of Canal, Well, and Tank (Lake, &c.,) Irrigation. Quantity of Water necessary for various crops and time of application. Water lifting appliances—The common leather bucket, the Persian Wheel, the Picotta (lever lift), and the hand scoop lift.

Manures.—Village refuse, Nightsoil, Cattle Mannre (partly used for fuel), Ashes, Bones, Fish Manures, Saltpetre, Green Mannre, Castor seed refuse.

Live Stock.—Characteristics of Indian Cattle—Mysore, Kistna River, Gujarat, Kankreji, Nagar, Sind, Hurrianah, Malwi, Deccan, Southern Maratha, Konkan, Kanevarya, Goranea, Bagondha, Madras Red, Trichinopoli, Gir, Nellore, Kangam, and Cinhalese—value as working and milch cattle. Buffaloes—Jaffiahad Gujarat, Nagpur, and common breeds—their general characteristics and special milking qualities. Horses and Mules. Goats aud Sheep. Common Diseases of the Domesticated Animals.

EGYPT.

Introduction. Physical features—Soil, Climate, Population. The Fellahin or cultivating class.

Irrigation.—The Rise and Overflow of the Nile—The Ancient Basin system of Upper Egypt—The Indian Canal System introduced into Lower Egypt—Drainage—The system of washing Salt Land.

Manure.—Pigeons' Dung—Ashes Sabakh (Crude Saltpetre).

The Chief Crops.—Divided into Winter, Summer. and Autumn Crops, with special reference to Cotton, Sugar-cane, Barsim (Clover), Wheat and Barley, Maize —Rotations and Methods of Cultivation.

THE SMALLER CROWN COLONIES.

Main Points of Interest in—West India Islands, British Guiana, the Straits Settlements, Uganda and other African Continental Possessions and Islands—Islands in the South Atlantic and Pacific Ocean.

Miscellaneous.—Relations of the Agriculture of the Colonies and India to that of the Mother Country—Exports of Agricultural Produce, &c., from the Colonies and India, with special reference to Earth Phosphates, Bones, and other manures, rozen Meat, Cotton, Grain (including Wheat), Tea and Coffee, Sugar, Fresh Fruits, Spices, &c.

MANILA HEMP AGAIN.

Manila Hemp is not hemp at all, but it is the fibre of the *bark* of a species of plantain tree; its botanical name being *Musa textilis*, *Nees* and helongs to the *familia Musacea*. This fibre is produced only in these Islands, although no effort has been spared to produce it in Borneo, Java, Sumatra, India, New Guinea, Australia and Africa, but without success. Formerly when it was shipped direct to the States it was invoiced as *Plan'ain Bark Fibre*, hut during the past 40 years it has been called Manila Hemp. Its value was early recognised by the American whalers who used to freqnent this archipelago over 100 years ago. Before the days of steam, when the crack American clipper ships ran between Liverpool and New York the smart appearance of those ships with their sails of snowy cotton duck and riggings of Manila Hemp contrasted very strongly with the British ships with their canvas sails and Russian Hemp rigging. Nothing in the world equals Manila Hemp for running rigging as it does not rot nor harden when wet like Russian hemp and its lightness and strength as compared to Russian hemp made it a valuable article for standing rigging before the days of wire rigging. Formerly an American Steam Cordage plant was located at Santa Mesa and the huge 12 and 16 inch hawsers for towing up the Hoogli to Calcutta were made here, as well as the famous whale line used hy the Pacific whalers, which was shipped to San Francisco and Honolulu. The United States navy has a rope walk at the Boston Yard and the cordage for the navy is made there ont of Manila hemp. The manufacturing of cordage is a very simple matter, but it requires the services of men who know their busines and they receive high salaries. The Manila hemp tree requires a pecular soil and a certain amount of m isture and sunshine, without these three conditions the fibre is valuless, besides the tree has to be cut down at a certain period of its life otherwise it is nseless for hemp purposes. The natives go into the Lates or hemp plan tations is gangs generally of two men, a woman and a boy. One man fells the trees or "ponos," the woman trims the trunks and the leaves, and splits them into the requisite length, the boy carries heseslabs to the other man, who with his crude cointraption

separates the film from the pulp. The hemp is then dried in the sun, and sold to the owner of the Late. On average days work for a gang of three persons is about 25 lbs. of cleaned hemp. The cleaning of the fibre from the pulp is very severe labor, and a man can only work at it for 3 days in the week, the earnings are very small and the life of a hemp cleaner is a short one, as a rule. These uneducated natives go into the nearest hemp Late, clean up the hemp and deliver half to the owner as his share, then sell to him the other half as their share. The owner of a hemp Estate has no sinecure, if he starts a new plantation and sets out his "ponos" he will have the monkeys and wild hogs to contend with: the former pulling them up to see if they are all growing and the latter rooting them up for food, what is left over requires from two to three years to mature, and during this period the "Late" must be kept clean from the rank growth of a tropical jungle in order that the young trees may receive their proper nourishment, then comes the tussle with the men, and if there is anything a native detests it is clearing a hemp estate from weeds. Up to the present time no appliance has been invented to cleanse the fibre from the pulp, and it remains to be seen if some cute Yankee" can get up such a labor saving machine. Fully 60 @ 75 % of the hemp finds its way eventually to the States where it is in great demand for "binder twine" for the wheat fields as well as for the boring of artesian and oil wells, to say nothing of the demand for cordage. The principal competition it encounters as a "binder twine" factor is the "sisal" grown in Yucatan, but a wheat farmer will readily pay double the price for Manila twine in preference to sisal, although the implement company may assure him that the latter is "just as good," but a smart wheat raiser knows better." When the railroad through Siberia is completed, and the rich "steppes" along the line are converted into wheat fields, a new market may result for Manila hemp.—*Manila Times.*

DATE PALM PLANTATIONS.

In his annual report the Conservator of Forests, writes as follows in reference to the date palm plantaions in the interior:—I am glad to report that the date palms in the far north continue to develop in a most satisfactory manner. Progress has been especially marked in the seedling plantation at Lake Hamy, as well as among the Algerian palms planted there. The seedlings are now from 3 ft. to 5 ft. high, and their general growth has been so uniform that a person working among them can only partly be seen. Many plants of either sex have also flowered. The Algerian palms have made great progress; some are quite 10 ft. high. They have developed numerous suckers, and is anticipated that some of these will soon be strong enough to transplant, and thus increase the existing number. Sufficient fruit was borne by one or two this year to show that a fine sample of superior quality may be ultimately expected when they get into full bearing. Unfortunately the only one remaining of the two received from Algeria, which were marked as being male palms, has now turned out to be a female, and it produced a few dates this season. This is to be regretted, has had there been a male of exactly the same kind of date, the use of its blossoms as a means of fertilising the others would have rendered it highly probable that the fruit subsequenely yielded by seedlings raised from the dates these palms produced would have shown little if any departure from the original excellent type of date. Fortunately, however, a parcel of fruit was obtained from Tunis last year through the courtesy of Professor Perkins, the dates from which are very similar in character to the "Deglet Nour" date from Algeria, and as seedlings are being raised from this seed the loss sustained will be somewhht modified.

The palms at Hergott continue to thrive and dates have again been ripened there, this being the eighth season that this fruit has been produced in the north. The occurrence of light rains, however, during the ripening period rather affected the quality of the dates this year, as the unbroken continuance of a dry arid heat is indispensable to the thorough perfection of the dates: but as this is a very exceptional experience at that time of the year it may be a long time ere it occurs again. A further effort has been made during the year to increase the number of seedlings in the experimental plot at Oodnadatta. On November 27, 1899, 236 seeds, which were obtained from Tunis, as already indicated, were sown there by the foreman [Mr. N. W. Wilson.] and most of them germinated, but only 24 were found to be living when he again visited the block on April 30, 1900. This number, however, with those that were alive the preceding year total 36, and with a little more attention it is expected that the area will be stocked quite full enough.

As the train goes up from Hergott and back only once a fortnight it will readily be understood that the intermittent nature of the rail service renders operations here very difficult, and necessitates leaving the plants to take their chance, as under present circumstances a resident officer cannot be maintained without incurring too heavy an expenditure. But while this retards the ultimate completion of the plantation it affords valuable evideuce as to what may be expected when the seed are simply sown and left to themselves, which it was the object of the experiment to sow.

The number of palms at Hergott and Lake Harry on June 30, 1899, was 3,013. The total increase from seed at Hergott for the year ending June 30, 1900 was 9; and at Oodnadatta 36. The total alive at Hergott on June 30 last was 277; at Lake Harry, 2,475; and at Oodnadatta, 36.—*Adelaide Advertiser.*

BANDA NUTMEGS.

An Indian specialist, describing Nutmeg gardens in Banda, says: "The agreeable scent which is wafted from the wood invites us irresistibly. The high canary, warringin, and teak trees act as a protection against heavy showers and gales for the conical Nutmeg trees whose foliage is formed by pointed leaves hanging down from the branches, shooting out regularly Between the shiny foliage sparkles the ripe open fruit of which the dark brown nut is the kernel, while the bright red mace envelops the nut as an elegant network. Occasionally we meet in the wood with bamboo bushes and other vegetation. Sweetly blows the cool air, invigorating and bracing is the scent of the Nutmeg, while the wood echoes with the merry voices of men and women gathering Nutmegs, and children picking canary nuts, mingled with the various sounds of the cooing nut-pigeons (manoek faloer,) parrots, the Indian nightingale (baikolie), the canary-yellow karajamoe."

A peculiarity of the nut-pigeons inhabiting the Archipelago is that they swallow the fruit bodily and discharge the nut whole and undigested. This curiosity, which no doubt leads to the distribution of the plant, was formerly connected even with its sex as shown in Vogel's remarkable passage; "If the bird that drops the nut is a male, the tree growing from it will be male too; if the bird is a female, the tree will be a female as well, whilst if the bird happens to be still a virgin, the tree that grows from the swallowed nut will be one of the best in the woods."

Whilst nature produces 100 male against 100 to 200 female trees, it is a fact that only the female yield fruit. On the whole the latter bear fruit when ten years old, but their produce at that age is still small. In the year immediately following, the produce increases rapidly, gradually again more slowly, until the highest point of production is reached between the twentieth and twenty-fifth year continuing undiminished during twenty-five years. Only then, about its

sixtieth year, a decrease may be noticed. Many trees, however, reach a much greater age; some of them are said to complete a century.

The Nutmeg trees bear blossom and fruit without intermission, in every stage of ripeness, and so nuts may be gathered all the year round. The greatest abundance, however, falls during the months of July and August.

The Nutmeg itself is the kernel of the fruit, which is pear-shaped, of the colour of a peach, and consists of four parts; the outer fleshy part, then the membranous substances covering the shell of the Nutmeg and known to commerce as mace, then the shell, and finally the kernel or actual Nutmeg.

The greatest care is required in gathering and handling the fruit. Twenty-four hours after the opening of the fruit—a sure sign of its ripeness—the nut will drop to the ground, thus injuring the mace-network and deteriorating its proper quality, as its lying on the soil makes it apt to become wormy. On the other hand, the closed fruit may be still unripe, and knocking these down would be highly injudicious.

Work commences at 5 o'clock in the morning at the ringing of a bell, when men, women, and boys and girls over sixteen years go out into the woods armed with the gaaigaai—a long stick with a prong at the end—to break off the ripe fruit and a basket to carry the collected nuts.

The wood is the all-in-all to the labourer. It is his place for work and recreation. It is his club, and even the spot where the young man seeks his future wife when the overseer is out of the way, notice of whose approach is kindly given by the friends of the young couples imitating the call of the nut-pigeon as a danger signal.—*New York Merchants' Review.*

RICE THRESHING AND HULLING IN INDIA.

The Indian cultivator cannot be expected to understand the scientific cultivation of rice, nor can the Indian *bunniah* be expected to realise the value of mechanical threshing and husking, or hulling, of rice. From time immemorial the paddy has been threshed and husked by the most primitive methods, which the people of the country have found good enough to meet their requirements. The importance of labour-saving machinery is not yet appreciated, and we can quite understand that a mechanical contrivance costing a thousand rupees, and intended for the purpose of the husking rice, is looked upon as an expensive luxury. But when it is realised that such a machine pays for itself in one year, and after that is a source of clear profit to the owner, land-holders will begin to see that it is to their advantage to invest in such a labour-saving and money-making machine. In such matters, however, it seems to be generally accepted that if the *Sirkar* were to take the initiative in introducing labour-saving machinery in Wards' Estates and show the advantage to be gained by such, the neighbouring zemindars would have an opportunity of seeing such machines at work, and thus be induced to invest in them to the advantage of their own as well as their ryots' pockets. We are led to these observations by a perusal of a most interesting article in the *Journal* of the Jamaica Agricultural Society for July 1900, on the cultivation and treatment of rice in Jamaica, by Rupert H. Lindo, a perusal of which will repay anyone interested on the subject.

After describing the cost of land, etc., selection of land, cleaning and preparing land, nursery for rice plants, planting out and reaping (all of which opperations are fairly well understood in this country), the writer goes into the questions of threshing, drying, hulling and preparing for market. Threshing is performed in this country by the ancient method of trampling by cattle, but were a threshing machine used out here, one small machine, worked by a small engine of two horse-power, could thresh 170 bushels per day of eight hours, each bushel, say, of 40lb., or equal to 6,800lb., equal to 170 maunds per day. Compare this with the outturn of the *ryot* by the old method, and we get some idea of the value of a steam thresher.

The writer of the article under reference then proceeds to describe hulling and preparing for market, and we cannot do better than quote his own words. He says: "This is the most important part of the process for treating rice, and it is the point that we have been aiming at from the very start; for, besides growing rice successfully, the next thing in importance is to place the paddy in the best condition possible for the huller to handle. Of course, one can always resort to the old mortar and pestles [these are used in India.—ED., *I. G. & P.*], but what can they do with 20 acres of rice yielding 1,200 bushels of paddy? The huller I use is of the 1895 patent, and is made by the Engleberg Huller Company of New York, and cost, landed in Jamaica, £60. They are pefect machines, all things being equal." The writer then gives detailed instructions as to how this machine is to be used, and suggests the central factory system for threshing and hulling rice. Such a system would seem to be well suited to this country, as the small tenants and cultivators cannot be expected to invest in a costly machine. The threshing and hulling could be done on the same principle as the cane-pressing is done all over Behar by the proprietors and patentees of the Beheca Sugar Mills. For an innovation of this kind to be successful it is essential that it should be initiated by the Government, as the people have faith in any undertaking that the Government patronises.

Those who desire to introduce mechanical threshing and hulling may be interested to know that the 'Engleberg" Rice Huller, so strongly recommended by Mr. Lindo in the article under notice, can be had at Calcutta from Messrs. Macbeth Brothers and Company, 2, Pollock Street, whose advertisement has been appearing in our pages for some weeks past. The price of a single Huller complete is R1,100.—*Indian Gardening and Planting.*

ACKNOWLEDGMENT.—A paragraph appears on page 336 of the *Tropical Agriculturist* for November 1st, which is taken from the *British and Colonial Druggist* without acknowledgment, we regret to find. The paragraph is headed "The Camphor Corner."

LIMES AS A GERMICIDE.—It may not be generally known that fruit acids are germicidal, but the information is of special value to planters generally. The juice of lime and lemon is as deadly to cholera germs as corrosive sublimate, or sulphur fumes, or any other disinfectant. It is so powerful a germicide that if the juice of one lime or lemon be squeezed into a glass of water, that if then left standing ten or fifteen minutes, the water will be disinfected. It makes little difference where the water has been obtained, or whether it has been boiled or filtered. This is a fact worth knowing, for anyone may at any time find himself under circumstances in which it is impossible to get either boiled or filtered water. In such a case the juice of a lime or lemon will purfiy the water perfectly.—*Indian Planters' Gazette.*

COFFEE UNDER A CLOUD.

[You might like to make extracts from the enclosed cutting taken from a recent number of the London *Globe.*—J. HUGHES.]

In a particular sense, the fragrant beverage has for many years past been most appreciated in this position. The affinity of coffee with "the weed" is an ancient discovery. There is a Persian proverb which declares that coffee without tobacco is meat without salt; while the Arabs say that a dish of coffee and a pipe of tobacco are a complete entertainment. And probably the majority of "men who dine" would agree that no dinner can be regarded as complete without the presence of those comfortable peace-makers at the end of it. For some time past, however, coffee has been under a cloud of far greater density than that raised by the worshippers of my Lady Nicotine. It is admittedly an exquisite beverage; but there are fashions in the best of good things, and even perfect institutions at times come under their sway. For the moment, coffee has almost entirely lost its domestic claims to consideration. Its presence on the breakfast-table is exceptional; and as for coffee at the great event of the afternoon—where is it? Or, to go a step farther with the cynic, what is it when it is there? We need not pause for a reply. As a social factor, the annual consumption of less than three-quarters of a pound of coffee per head of the population of Great Britain is quite insignificant. It leaves us, so to speak, at the very bottom of the coffee-tree the top of which is reached in Holland; the Dutch, with an allowance of twenty-three pounds per head, being by far the greatest coffee-drinkers in Europe. In England, therefore, coffee is now passing through a phase of almost total obscuration. Doubtless it will presently emerge, perhaps, to become again the radiant centre of social life. Of course, the connoisseur—the man who "feels" a cup of perfect Moka as a youthful poet does his first sonnet—still gets his coffee as of old. The majority, however, are obviously indifferent; they are content to wait till the cloud rolls by.

The praise of coffee has been so universal that its merits may well be taken for granted. More curious is it to trace the leading cause of its decline. And that which probably underlies all the multifarious reasons assigned is the fact that its preparation involves a little more care and trouble than tea. Ours is a trouble-saving age, and we are apt to adopt what is narest aud radiest. What is not easily done is easily left undone. Given good tea to begin with it is difficult to be at cross-purposes with the teapot. An optimist has even declared that "nothing is easier than to make good coffee." But he is manifestly in error; it is easier to make bad. To say that "the dullest girl can be taught to make good coffee in three lessons" is against the common experience of domestic life. But as a rule the coffee-maker is not solely in fault; the common failure of the beverage to attain a reasonable standard of excellence is due to more than one cause. Determined, however, to agitate in this useful branch of reform, and starting with the planter's maxim, "old coffees, young teas," there is no reason why ordinary householders should not mature the bean in their own store-closets. It should be kept raw, and preferably in small bulk; the grateful aroma being due to a volatile oil which is developed in the process of roasting. If kept too long afterwards the flavour deteriorates, but even this may be to some extent received by carefully heating the ground coffee before use. The connoisseur declares that coffee should not be boiled, nor even allowed to "stand" for any length of time. And this, indeed, is the very crux of the question. Of course the delicate aroma and fine flavour may be entirely lost by excess of boiling; and it is to avoid such a contingency that the expert assures us that "right" coffee should be a simple

infusion, instead of the too customary decoction. Unfortunately, however, the experts themselves are largely at variance on this point. Some of the most experienced makers allow their coffee to "boil up" for a single minute, and with a most satisfactory result. Others—among whom was Brillat Savarin—simply infuse their coffee like tea. In short, scarcely two persons make it in precisely the same way at all points, nor is there any royal road to this great achievement.

A FARMERS' EVERY-DAY LIFE.

NO, 15.

(*By Cosmopolite.*)

THE HARVEST.

How delightful it is to sit at one's "ain fireside," listening to the howling of the wind in the chimney and the ceaseless patter of the rain on the window; and to know that everything on the farm is secure, the stacks in the yard, trim and cool and already for a harvest thanks-giving, as soon as the clergy may think proper to announce such a day of fasting. I know that all my neighbours cannot be in this equable frame of mind, but I speak for myself on this occasion, and am thankful that I have got through this rainy harvest so successfully, although it has been an anxious time whilst it lasted. The peripatetic steam mills are engaged night and day thrashing out the heated stacks of the careless farmers, and the price of grain is going down by leaps and bounds. In a month or so all this par-boiled grain will have been worked off the market, and then I hope the price will go up again, and those who have good grain to sell, may get a fair price after all. There are great complaints about the grain turning out short in quantity, to the extent of a sixth of the expectations and I am, therefore, somewhat anxious to have a day's thrashing, so as to get a fair idea of my probable outturn. It is a very amusing thing to hear some old farmers talk (especially after their third or fourth nip) about the wonderful crops they have grown in their time, and the grand prices they got for them whereas now—alas! alas!! Comparisons are sometimes painful. But what imagination some of those old fellows must surely have particularly on the subject of

OAT CROPS

about which they expatiate with overwhelming eloquence. I suppose it is true that as one grows older one's pleasure is chiefly found in reminiscence and so those farming raconteurs must find it a relaxing pastime to babble about their past history and achievements, giving play to their fancy as they embroider the details of some specially enjoyable narrative. Why has no eminent author sprung from the ranks of the agriculturists—one who could give to the world, at a popular price, an edition of stories gathered on market days or in the peaceful retirement of the publican's booth? Such a book entitled "Fairy Fancies from Frivolous Farmers" would, no doubt, sell well and become a standard work on the shelves of all village libraries.

During the past few weeks the great

SHORT-HORN SALES

of the North have been much in evidence, and exceptional prices have been agoing, the purchasers having been chiefly Foreigners, Englishmen and Colonials. The top average was secured by Mr. Duthie, of Colynie, with £150 8s; but even unknown breeders made averages of £50 and £60. Although the best short-horns in Britain are bred in Aberdeenshire, this is not the class of cattle mostly kept by our farmers, the black-polled being the fancy breed of the district, and the one that has carried the name of Aberdeenshire to the front at every show of beef-producing cattle that has been held in Britain. Since McCombie of Tillyfour carried everything before him, at Paris, with his Black-Polls from Aberdeenshire, the breed has never gone back, and these still remain the champions of the World.

In every agricultural paper, as a matter of fact, the greatest number of articles and the greatest amount of space is taken up with the subject of

DAIRYING.

Now, there is no doubt about it that money is made by dairy-farming, but neither easily nor pleasantly. One hears a great deal about the joys of a dairy farmer's life; the buckets full of frothy milk, and the mild-eyed cows, chewing the cud as they cheerfully give up the lacteal fluid to their kind friend, the dairyman. But there is another side to the question, and one about which I have lately been cross-examining a dairy farmer,—a man who has gone through the whole curriculum, from under-milkman to boss of the milk buckets, and his views are, I think, likely to interest my readers. The ordinary routine of this dairyman's work is as follows:—He rises at 3-30, milks about a dozen cows; washes himself in icy-cold water; takes a hasty meal by the dim religious light of a candle; drives off to town, a distance of five miles, and distributes the milk to his customers before seven o'clock, this being done in the dark during the winter time, unless when a moon happens to be on the *tapis*. He gets home again, just when most people are about to break their fast, and then he proceeds to cut chaff for a few hours, a horrible grind, which, however, gives him plenty of exercise. Then he has to milk the cows again, and, in the evening, feed them and get his own supper. After that he has six hours in which to clean himself, get ready for next day's work and try to get some sleep, and no sooner has he fallen into a sound sleep than he hears the usual morning call and knows that it is half past three. Now this jolly sort of a life goes rolling on, not for five or six days, but for seven in every week, and so, I think, no one should grudge the dairy-man his profits, when the miserable existence which he leads is made known. I suppose I am the only farmer in Britain who buys his milk, in preference to keeping cows, as I find it more profitable to do so; and also because the work of the farm goes on more smoothly without the irritation connecetd with a lot of dairy cows.

COFFEE, CINCHONA AND CARDAMOM PLANTING IN SOUTH INDIA: THE KANAN DEVAN DISTRICT.

SIR,—In your issue of October the 20th, you reprint from the *Investors' Review* without comment an article on the "Kanan Devan Produce Company, Limited." I hold no brief for Sir John Muir or his Companies, have nothing to do with them in any way as a shareholder, or otherwise, and am as much disposed as anybody to criticise much of their action and policy. I have no doubt Sir John Muir and his co-Directors can take care of themselves as regards this attack and as clever-headed businessmen know what they are about. But the article in question is likely to harm the prospects of the Kanan Devan District generally, both as regards its credit and its position towards the Madras and Travancore Governments. For, although the Kanan Devan Produce Company own the greater part of the Kanan Devan District, there are some private owners as well holding a considerable acreage of land, and, although not dependent on the Company, the outsiders' future is, to a certain extent, bound up with its prosperity, or otherwise. This is emphasised by the fact of there being a Planters' Association in existence consisting of the Company's representatives and the outsiders, of which I have the honour to be President.

My opportunities for judging of the Company's prospects and properties are therefore considerable and are augmented by the fact of my having been for nearly twenty years a resident planter in the district. I am not prepared to take the pessimistic views of the writer of the article in question, and, in justice to the credit and welfare of the district, I trust you will allow me to state my reasons in your columns.

The figures quoted in the article, and which are no doubt correct, are, as they stand, misleading. No statement of the age of the area opened is appended, and one would be led to suppose that almost the whole of the acreage is unproductive. This is not the case, as operations by the Company were commenced in 1894. While the estates purchased, several of them at very low prices, date back many years previously, there are at present on these Hills and belonging to the Company 3,000 acres in mature bearing and 2,000 acres in partial bearing; 7,800 acres are immature. The reserve forest and grass in this district is some 100,000 acres. The latter is ignored in the article! In Assam, I believe, the Company hold between 2,000 and 3,000 acres of tea and some 7,500 acres of first class freehold forest.

It should be recollected that a practically new and difficult district has been opened up and that enormous difficulties of transport have had to be and have been successfully overcome. Thus, for instance, the capital outlay includes 34 miles of cartroads with tramways, a wire ropeway from a ghaut of over 6,000 feet to the low-country and ⅓ cost of 10 miles of a cartroad in the low-country, the latter designed and built to take a light railway.

But the benefits of this liberal initial outlay will hereafter be apparent in many ways quite apart from the fact that any more land opened in the future will be capable of being brought to bearing point at an expenditure of not more than £20 per acre. The estates have been carefully blocked into large areas and well conneeted and traversed by good roads and will, therefore, be easy of management and superintendence. The number of factories required will be reduced to a minimum. The cost of transport of tea and other produce down and estate requirements up will be rendered as low as possible, and thus only will produce be able to compete with other districts, more favoured as regards

situation. It has been carefully calculated that the cost of a lb. of tea, f.o.b., will not be more than 25 cents. Thus, while produce will be put on the market at a low rate, it should be remembered that all the tea will be high grown from 4,700 feet to 6,500 feet, that it is all grown in magnificent forest land and that therefore both yield and prices should be high. It is true that, at present, prices realised are not very sumptuous, but this is partly due to Travancore teas not as yet obtaining the attention they deserve in the market, a position that will remedy itself as a larger supply creates a larger demand; partly it is due to inadequate factory accommodation, a matter which is being remedied as fast as possible; partly it is due to all the tea here being young and giving a cup of insufficient flavour and strength. The fact that the Company possesses considerable Cinchona estates in full bearing is slurred over in the article; these should, during the present year alone, give a nett profit of some £23,000. Speaking generally the estates and the district should be seen and compared with others of a like age before an attempt is made to criticise the Company's present position and future prospects. Armchair criticism of figures is an easy matter, but no doubt, these figures were carefully considered before they were sanctioned and undertaken.

But it is further impossible to look upon this large concern merely from the point of outlay representing so and so many acres opened. There are the huge reserves of land not yet dealt with and they represent a large share in the capital outlay, dormant at present, but which will in time undoubtedly be utilised. Thus, apart from the reserves of forest suitable for coffee, tea, and cinchona, there are large areas of land suitable for rice and other food products where some day the Company will be able to grow all that is required to feed its estate labour.

Then there is a large area of higher grass land in the Kundalé valley close to the wire rope outlet, eminently suited for a Hill station sanitarium situated at 6,000 feet above sea-level with a rainfall not exceeding 50 inches with magnificent scenery and well watered by the clearest and coldest of streams, this should become a favourite retreat for the man from the plains. For this to come about and the land to become valuable for settlement purposes, the long-deferred railway from Ammayanaykanur will first have to appear. But as that also will again mean a reduction in the cost of tea, f. o. b., there is no doubt Messrs. Finlay, Muir & Co., will see to its coming. Then there is the magnificent water-power, at present running to waste, but some day, though perhaps not in the immediate future, to be utilised in conjunction with the almost pure iron lying beside it. In conclusion, it is my belief that, in spite of the large capital drawn attention to in the article, the estates being well opened will pay well and that many years will not pass before this is one of the most flourishing among Planting Districts.

J. VON ROSENBERG.

—*Planting Opinion*, Nov. 17.

CINCHONA PROSPECTS.

We direct the attention of all interested in cinchona (and we are glad to think the number is increasing in Ceylon) to the long letter given in our last issue—with which Baron von Rosenberg, of North Travancore, has favoured us. Our correspondent is well-known as one of the most enterprising planters of cinchona trees in Southern India, and as a proprietor who, through good and evil report, has adhered to his first love and who has therefore, merited a better return for his capital and labour than has, we fear, as yet been secured by him. But the Baron well knows that he is only one among many thousands of planters who failed to realise their expectations in cinchona. No more romantic story has ever been written in connection with planting enterprise in the tropics than could be penned in the history of cinchona planting in India and Ceylon from the day Clements Markham—still hale and hearty in England—brought the first precious plants from far Peru to the Nilgiris and Hakgala, forty years ago. At first utterly despised as only a "medicine" plant by the ordinary tropical planter, or put out as a quick-growing, handsome shrub for avenue or wind-belt purposes,—with the failure of coffee and the harvesting of the first bark from the said belts, (realising as much as 10s per tree nett of crop), there came a wild rush into "cinchona" with the disappointing result only too well remembered even now in Ceylon. Not only were planters bitterly disappointed, if not ruined, when the enormous export in one year from Ceylon of fifteen million lb. took place; but cinchona dealers and brokers in London—who at one time monopolised and made a good thing out of the trade—found themselves utterly at sea in their estimates and with large unsaleable stocks in hand, and had to wind up and disappear. Even quinine manufacturers suffered severely and several factories also disappeared. If ever, therefore, any men had full warning as to the need of caution, they are the planters of cinchona, the dealers in bark and the manufacturers of quinine; and yet our correspondent today thinks a further and special word of warning not to be out of place. He holds that we are in now for a period of decreased production extending over the next five or six years—and this we can quite believe—and simultaneously, that the demand for quinine during this same period is likely to increase steadily. The "unit" should, in our correspondent's opinion, be well maintained if not increased during this period, and that would enable planters to do justice to their trees, and would also encourage further and careful planting, especially in India and Ceylon. There is much good sense in all this. We have to guard, on the one hand, against a temporary "boom" in prices leading to a rush into harvesting and even into "prospecting" in South America; and on the other, against such a fall as would discourage planting altogether. Baron von Rosenberg thinks that the happy medium is found in 2½d. as the price per unit in bark and 1s. 6d. as the selling price per ounce of quinine. If that be the case, long may such rates be maintained. Our correspondent winds up by giving a much-needed warning as to the seed used by cinchona planters. That seed generally has deteriorated, is only too true. We think that seed from old trees in Java, Ceylon and India should only be used when interchanged and that none should be utilised in the country of its growth, except under entirely new conditions,

Still better would it be to get a fresh supply of seed from Peru or Bolivia, if the collection and carriage were feasible at a moderate outlay. As regards "planting" we know that a good deal has been done in Ceylon in a quiet way this year. One proprietor in a favorite district is planting twenty acres with cinchona and doing all possible justice to the experiment; while others are following our advice about planting up boundaries, the sides of paths, ridges, &c., with the graceful cinchona chiefly of hybrid or officinalis varieties. May a full measure of success be attained in these experiments.

TOBACCO AS AN INSECTICIDE.

An authority in the Antipodes gives, in the *Agricultural Gazette of New South Wales*, the following advice as to best way of using the ordinary dried tobacco leaf as an insecticide: "For aphis, the roots of the affected trees are bared, and the tobacco, ground to powder, is dusted well over the roots and ground about them. A ring of tobacco dust is put round the trunk of the tree just below the surface. The earth is then thrown back, and when rain comes the nicotine is washed out of the tobacco, and gets spread over the roots, killing all black or woolly aphides with which it comes in contact. Secondly, as a wash: one pound of waste tobacco will make about four gallons of wash, and half pound of soap is added to make it more adhesive. The leaf can be steeped in cold water over night, and the soap boiled up and added; but most orchardists boil up the leaf and soap together straining the resulting liquor and applying it hot. Tobacco is a contact poison, and is the best known remedy for soft-bodied things like aphides, but it does not affect scale insects very much, when they are full grown and protected by their shelly outer covering. If tobacco wash could be sprayed on to the larvæ of scale insect it would destroy them wholesale."

FRUIT &c. IN WEST AUSTRALIA.

It has been said that "Westralia is all Sin, Sand, Sorrow, Sore-eyes and Sir John Forrest." This is certainly most untrue. I have been on a visit to the Great Southend Agricultural District (on the Railway Liue from Perth to Albany) and have seen enough to convince me that the precious ore is not the only attraction in this vast land. I stayed for about a week at Rataning, a great farming centre. The crops on many of the farms are magnificent and the orchards, it would be difficult to equal anywhere. I saw fruit orchards on which not a drop of water has ever been poured and over the whole area of which one could travel and not find a withered leaf. The abounding vigour of all

THE TREES AND VINES

is the outstanding fact that attracts the attention of most visitors. Oranges do not do well but apricots, apples, cherries, almonds, &c., are in their element—the two former doing splendidly. I saw cherry trees that you could not touch with your hand without touching fruit. These cherries fetch one shilling per pound on the ground. In an orchard that despatched 33 tons of grapes last year I could not discover a single "supply" among the vines, though I went round twice. A Homestead Farm of 160 acres can be had in this district for £1. Of course, the canny Scot is here, and there are 19 Macdonalds alone in this one district.

LIME AS A FERTILISER.

Lime is a good fertiliser, but not for all plants. It is beneficial to some, injurious to a few, and indifferent in result to others. "Farmers' Bulletin" No. 77, issued by the United States Government Agricultural Department, gives good information on this subject. From it we gather that the following are some of the plants which have shown marked benefit from the use of lime. Spinach, lettuce, beets (all kinds), gumbo (okra), salsify (vegetable oyster), celery, onion, parsnip, cauliflower, cucumber, egg plant, cantaloupe, asparagus, kohl-rabi, cabbage, dandelion, Swedish turnip, pepper, pea, peanut, martynia, tobacco, sorghum, alfalfa, clover, barley, wheat, oats, timothy, and Kentucky blue grass. Not only was the crop greater, but in many instances it was ready for market much earlier where the soil was limed. There was at least two weeks' difference in kohl rabi in this respect. Tobacco not only made a much better growth when limed, but the ash was much lighter in colour. Those that are injured by liming are suradella, water melon, blue lupine, and common sorrel. Standing between the two groups of plants given above are a number which when they are supplied with all of the nitrogen they required in a readily assimilable form such as nitrate of soda, show little or no benefit from liming. Among those are Indian corn, common millet, Hungarian golden millet rye, potatoes, carrot, Rhode Island bent (grass), and redtop (grass). On a very acid or sour soil even those plants would be benefited by lime by virtue of its helping to change the nitrogen into readily assimilable nitrates, provided sulphate of ammonia, blood, tankaje, fish, cotton seed meal, plant-roots, etc., were present as sources of nitrogen. Intelligent farmers in malarious districts may make their own choice from the above facts and be properly guided in the use of lime for agricultural purposes.—*Indian Agriculturist*, Nov. 1

HYBRID FRUITS.

An article on "Conifers," in a recent number of the *Speaker* mentioned the immense improvements which careful selection and cultivation have made in flowers and fruits: but the vast promise which the hybridisation of fruits seems to hold out was not mentioned—that is crosses between fruits of the same class. One may, perhaps, wonder whether something of the same sort might not be attempted between vegetables. A few years ago an enterprising amateur gardener and fruit-grower at Blandford had some hybrid fruits—crosses between mulberries and raspberries, blackberries and raspberries, strawberries and raspberries, &c. Perhaps it was prejudice, but I thought the uncrossed fruit superior. The other day, Mr. Forrester, Lord Portman's steward and a famous and successful cattle-breeder, showed me some very fine hybrids, called Logan berries, between the raspberry and the blackberry. They were darker in colour than raspberries, and much larger and longer, and really very nice eating, though use has much to do with one's appreciation of flavours. The Loganberry is reported to be an American hybrid between the red raspberry and the blackberry. The berries are of enormous size, fully as large as the largest blackberries, which in form and structure they resemble. They are deep reddish-maroon in colour, melting and without a core, and very firm. Gathered, or on the bush after being ripe, they keep a long time without spoiling. The flavour is rich and sharp, with a dash of the raspberry and of the blackberry, mellowed, and refined, but distinct from either, and so luscious, novel, and agreeable that the Logan berry cannot fail to become a great favourite as a dessert fruit, while as a preserve it is said to be unequalled. The canes are strong and vigorous, semitrailing in habit, and very prolific. They fetch 2s. 6d. each, or 24s. a dozen, but no doubt should

they get into general favour prices would fall materially before long.

A paragraph in the *Times* not long ago is suggestive and interesting: its substance is somewhat as follows:—At a meeting this summer of the Royal Horticultural Society, a fruit was exhibited for the first time which bids fair to become very useful. Botanically, also, it is of considerable interest, the plant bearing it being a hybrid between the raspberry and the common blackberry. As the "Mahdi," as it is called, was raised by Messrs. Veitch, its origin is well authenticated, the seed parent being a variety of the raspberry known as "Belle de Fontcuoy." The same cannot be said for the Logan berry from the other side of the Atlantic, though for this a somewhat similar parentage has been claimed. A high authority is of opiuion that the raspberry plays no part in its composition, and that both its parents were and American species of Rubus. This may be so, but cooked Logan berries are certainly much more like raspberries than blackberries, and have none of the tartness of the latter, but closely resemble the former. The "Mahdi" has very much the habit of the blackbeery, and in cultivation is trained in the same way. Its frus, says the *Times*' writer, recalls the dewberry of our hedges. There is the same bloom, but the number of fruitlets is greater. Careful investigation reveals many intermediate characters—for instance, the flavour of the "Mahdi" combines a preponderant influence of the dewberry with a suspiciou of the raspberry. The present writer would therefore hold that its parentage would differ largely from the Logan berry, though the latter when cooked resembles a luscious raspberry, the blackberry flavour being hardly perceptible. Most important is the time of fruiting as regards the economical future of the plant, for it comes into bearing as raspberries are failing and before blackberries are ripe; but the finest berries are produced early in the season—about the middle of July, that is. The "Mahdi" is very prolific and has considerable claims as a decorative plant: it would not, however, be placed upon the market for probably at least another twelve months.

The Japauese wineberry (*Rubus Phoenicolasius*) is another recent introductiou to our gardens and should be mentioned here. It bids fair to be a great acquisition to our gardens. Properly cultivated the plants bear a quantity of delicious fruit, which ripens well in a warm corner. The plant itself is hardy. It resembles in growth the blackberry, but the foliage is larger, with silvery reverses to the leaves, and the thorny stems have a deep crimson-brown tint, and are decidedly handsome. Until about half-ripe the fruit is concealed by a crimson, hairy, calyx-like covering, protecting it until it is as large as a fine blackberry; it has a clear wine-colour, transparent throughout. As each spray bears thirty or forty fruits and they are finely flavoured like the best sort of blackberry, it will be admitted that this latest addition to our fruit garden is not to be despised. Besides being valuable uncooked, the wineberry makes excellent preserve, its fine acid flavour making it specially suitable for cooking. The fruit is found on the wood of the former season, and the strong suckers thrown up in summer should be fastened back with wire, to expose them thoroughly to ripening sunshine. A mulch of rich soil in June over the roots helps the fruit to swell better and the plant enjoys abundance of liquid manure and water. It is highly ornamental in August with its scarlet berries and should be largely grown.

The Logan berry makes, as I can personally testify, most excellent jam and in a pie it is far better than the raspberry, while the blackberry is tart and commonplace in the comparison and not in the running at all. The seeds of the blackberry are hard and disagreeable. Those of the Loganberry give no trouble.

As some hybrids have been so successful, one can surely hope that a great future lies before fruit hybridisers. Shall we not live to see many practically new fruits, and seeing what careful cultivation has done for raspberries and strawberries, it is possible that the gardens of the wealthy in a dozen years and, perhaps, too, in time, even those of the poor, may abound in splendid hybrid fruits, larger, more luscious, and more palatable than anything we now find in them.

Mr. and Mrs. Forrester, seeing my interest in a subject with which I can claim no special acquaintance, have drawn my attention to the Chinese artichoke (*Stachys Tuberifera*), a new vegetable of distinct flavour, to which the Royal Horticultural Society has awarded a first-class certificate. They say it is very palatable and profitable. It is described as a most agreeable, perfectly hardy vegetable, novel in appearance, and easily cultivated in any garden. The roots may be left in the ground through the winter and dug up as required; the surface of the earth should be covered to prevent frost hardening the soil.

The plant grows to a height of 9 to 15 inches, is free-branching, and forms neat bushes. From the axis springs a large number of fibrous roots, on which the tubers grow in immeuse numbers. The tubers are 1 to 2 inches long, and are half-an-inch in diameter at the thicker end, tapering to a point at their attachment to the root. They have a spiral appearance, are pearly white, and eaten raw, are intermediate in flavour between a succulent radish and a Jerusalem artichoke. Boiled, steamed or roasted and served with melted butter, in much the same way as the globe artichoke, they are delicious and make an excellent dish. When planting soil should be throughly pulverised so that the roots can run freely and the tubers can swell without hindrance. From 18 inches to 2 feet is the proper distance to put the rows apart and the distance between the plants should be 8 to 12 inches. Planted at this distance apart a bed 5 feet by 30 would give a good returu, sufficient for most families. As the tubers when exposed for any length of time get rather discoloured, they should be covered with soil till wanted for use.

ALFRED J. H. CRESPI.

CACAO PLANTING IN CEYLON: SPLENDID CACAO PODS.

A Colombo merchant writes:—"When so much is being written about the cultivation of cacao, the accompanying specimens, grown on Katugastota estate, may interest you and show you that there is still a future for cacao."

We have scarcely ever seen finer pods. Here are the weights and measurements of the two pods before us, which we must send round Fort offices for inspection:—

13 in. long by 13 in. in girth, weight $3\frac{1}{2}$ lb.
14 do. by 14 do. do. 4 lb.

Can these be beaten?

THE SUSTAINING POWERS OF BANANA.

One of the most courageous marches ever taken was that of Colonel Wilcocks to Kumasi. We hear that during the march from Kumasi the whole party lived on bananas. On one occasion they even waded shoulder high through a river for two hours. Does any one want a higher test of endurance on a vegetable diet than this?—*Journal of Horticulture.*

A NEW GREEN TEA-ROLLER.

It is stated that a well-known firm of Calcutta engineers will shortly introduce to the industry a new leaf roller, which has been designed by Mr. Perman, an experienced Assam engineer planter. The machine will be called the "Express," apparently the name is justified in view of the fact that 300 lb of green leaf can be efficiently rolled in about 20 minutes. The new roller is circular in shape, occupies a space of about 4 feet square only, and last, but not least, the cost will probably work out less than that of other existing rollers.—*Planter*, Nov. 17.

BRAZIL COFFEE NOTES.

The steamer "Dacia" which left Santos on the 21st ult. carried 100,020 bags of coffee. This is said to be the largest cargo of coffee that has ever been shipped from the port of Santos.

To a circular of the state government of S Paulo asking for estimates of the coffee crop for the year 1900-1901 answers have been received from 71 municipal districts, whose production is estimated at 3,643,867 bags. From 92 municipal districts no answers have yet been received. We presume that in those that have been reported the most important coffee-producing districts in the state are included —*Rio News*, Oct. 2.

UGANDA: A PARADISE FOR COFFEE;

COTTON, RUBBER, EBONY, TIMBER, AND OTHER PRODUCTS.

Coffee grows wild over all the more hilly districts of the Uganda Protectorate. When properly prepared it has a delicious flavour, and is quite fit to be put on the market as gathered from the wild bushes. Coffee yields the most encouraging results under cultivation. Mr. Whyte is of opinion (and from the little I know I agree with him) that the Kingdom of Uganda and the adjoining districts of Busoga, Unyoro, and Toru are destined to be great coffee-producing countries. The soil, the water supply, and the abundance of shade from forest offer conditions and advantages rarely present in equal force. Local labour is almost as cheap as in British Central Africa; but, of course to make coffee-growing possible as a commercial enterprise, the railway must be completed to the lake, and steamers on the lake must gather up the coffee crops for transport to the rail-head and thence to Mombasa. Given the railway and the steamers, and I think no other part of tropical Africa could compete with Uganda as a coffee-country.

Cotton grows wild, or half wild, in many places, and is to some extent cultivated in the Nile Province, chiefly on the sites of Emin Pasha's former settlements. It is of good quality and long staple, but, except for local purposes, it is not worth consideration, as it would probably never pay to export it over the railway to the coast.

The castor-oil plant grows abundantly, and the oil which is very easily obtained by crushing, is very useful for lubricating purposes.

Sesamum seeds yield good oil. They are met with here and there in Uganda, but not so abundantly as in British Central Africa.

Rubber (chiefly from two species of Landholphia, from a *ficus* and perhaps from a tree called scientifically *Tabernæmontana*), is probably abundant in every thicket of the Protectorate below 5,000ft. in altitude. Rubber will probably become a very important item of the Uganda exports; but at present time, although the natives know of its existence, and of the trees which produce it, they make little or no effort to collect it for sale.

The ebony trees (*Diospyros*) grows in the western forests, where also the camwood (*Raphia*) is found. A common tree in Uganda is the "incense" tree, the constantly exuding gum of which is the principal ingredient in increase. I do not remember to have seen this tree growing in such numbers in any other part of Africa, or for it to be so easy to obtain its delicious-smelling gum. As a matter of fact, when ever one wishes to fumigate a house or room, and to replace the mustiness of these dwellings by an agreeable odour, one has only to send a native servant to a short distance to scrape the exudations off the incense tree and place these on hot charcoal, and a delicious smell of incense at once arises.

I should certainly think that the splendid timber which can be obtained from the Mau forests would be an important article in the future exports of Uganda. This timber will be derived from three conifers—a juniper, and two species of *Podocarpus*. I do not suppose that this timber would be worth exporting to England, but it would certainly vie with Scandinavian timbers on the East Coast of Africa, and even perhaps in India, the more so as it is said to be left untouched by the white ant.

All the southern half of the Uganda Protectorate to the south of the 2nd degree of north latitude is a country of forests. The forests of the Mau-Plateau, Mount Elgon, and the Suk Hills resemble in appearance more the woodlands of a temperate country. The trees belonging either to genera or species found in Cape Colony, or else—and to a considerable degree—in the forest of Abyssinia. Some of this—so to speak—Abyssinian forest has rather a European look, and, no doubt, has European affinities. On the other hand, the forest of Busoga, Uganda, and Toru are essentially West African.

All their great timber trees—African teak, *Oldelandia, Diospyros, Parkia, Parinarium, Khaya* and *Vitex*—though they are represented to a great extent in East Central Africa as far as Nyassaland, seem to be more closely allied species to those of West Africa. Indeed, on entering these magnificent tropical forests—some of them the finest developments I have ever seen—one might believe one's self in the Cameroons, in the Niger Delta, or in the Liberia. The forests on the slope of Mount Ruwenzori range from a purely tropical character up to the Abyssinian vegetation of the Mau Plateau. A great deal of the local timber, no doubt, would not be worth exporting but it is likely to prove of incalculable benefit to the country itself, as it serves for ship-building, house-building, furniture, and the finest work in joinery. In the forest regions of Uganda below 5,000ft. there are, I believe, only two kinds of palm represented—Makindu or wild date, and a magnificent species of *Raphia*, which, unlike other *Raphia* palms, towers to a greater height of stems. The trunks of the date palms are employed for many purpose in buildings. They make excellent piles for wharves of piers; columns for supporting the verandahs of houses; in fact, they can be turned into a variety of purposes, and there is such a demand for them that some forestry regulations will soon have to be instituted to protect them from undue destruction. The mid-ribs of the *Raphia* palm fronds, which are of enormous length, are also very useful articles as rafters.

I have touched on a few of the native vegetable Products of Uganda, but it should also be borne in mind in considering the resources of the country that the soil and climate of about half of the Protectorate are admirably suited, at different levels, to the cultivation of cacao and tea. Mr. Whyte, who has had considerable experience in years gone by in different plantations in India and Ceylon, considers parts of the Uganda Protectorate as singularly well adapted for the cultivation of the tea plant. He compares such parts of Uganda as are suited for this cultivation to the estates of medium elevation in Ceylon. The rain fall, he remarks, is a little less than it would be in

such parts of Ceylon, but he considers it much better distributed all through the year. There is very great demand for tea amongst the more civilised natives in Uganda and Toru. Mr. Whyte thinks that the local demand for tea (as, indeed, for sugar, coffees, cacao, and other products) is worthy of consideration. No doubt, also, when communication by means of the river Nile is better organised and the sudd cleared away, large quantities of Uganda products could be sent down the Nile to feed the Soudan.

The sugar-cane thrives wonderfully in the better parts of the Uganda Protectorate. It is cultivated in nearly all the native gardens. Individual canes are often met with 15 feet long, robust, and long-jointed, and as well developed as the average cane in the West Indies. The Uganda sugar-cane goes on ratooning for years, and forms a considerable item in the native dietary. We have now got up machinery for crushing cane, and are already turning out coarse sugar, which forms part of the rations of the Indian troops, and enable us to save considerable expenditure, as formerly this coarse sugar (gur) had to be imported all the way from India.

Almost all English vegetables grow and are grown in the Uganda Protectorate with encouraging success. Orange, lemon and mango trees, which were planted a few years ago, have done exceedingly well; but, except on Mau Planteau, it would be impossible to grow stone fruit, apples, pear, or any of those trees which require a real winter.—Zanzibar *Gazette*, Oct. 31.

TEA CULTIVATION IN RUSSIA.

Indian and Ceylon tea growers have not much to fear from competition with Southern Russia. The progress so far made with the cultivation of tea along the south-east coast of the Black Sea is but slow, and it is the opinion of many authorities that the industry cannot possibly assume any very great proportions for a considerable number of years. This information is afforded by the British Consul for the district, who adds that with the exception of the Imperial Domains and the firm of Popoffs of Moscow, no other tea planters of any importance have shown any inclination to purchase lands for tea culture, and that in reality the results obtained up to date are not of such a nature as to inspire would-be tea growers with the necessary confidence to place capital in such enterprises. Messrs. Popoffs, who own three extensive plantations in the neighbourhood of Batoum, are apparently wearied of the results of their eight years' experience in the business, and are, it is reported, negotiating the sale of their property to the Imperial Domain Lands.—*Home and Colonial Mail.*

THE GOURAMI FISH IN CEYLON.—We are reminded that at a meeting of the Fishing Club about a year ago, Mr. W. E. Davidson reported :—

Mr. Davidson said that last week a tub arrived at Colombo with five young Gourami fish from Messrs. Scott & Co., of Mauritius. This was a fresh attempt which Mr. Burrows had made to ntroduce this fish into Ceylon waters by way of an experiment. The fish were now with Mr. Fowler, who proposed rearing it in Colombo, as they only thrived at sea-level. He (speaker) had had a deal of correspondence on the subject with people, who were experienced in the rearing of this fish and had found out that they do not thrive above sea-level.

We have some idea that Mr. Fowler afterwards reported a failure of the Gourami? But one or two trials should not suffice. There is room for another.

PETROLEUM AND KEROSINE OIL IN CEYLON.

Very few, we suppose, have a proper idea of the importance of the Bulk Petroleum Installations in this island, which have been established in connection with the regular visits of the Shell Transport and Trading Co., Ld.,'s tank steamers. This Company is in itself one of the largest in the world, with a capital of two millions sterling, and a fleet of twenty-three steamers, besides numerous small craft. As local agents, Messrs. Delmege, Forsyth & Co., apart from the headquarters' installation at Kochchikade where 450,000 gallons of petroleum can be stored, have now in full working order tank depôts at Galle, Kalutara, Kurunegala, Kandy, Nawalapitiya, Hatton, Nannoya and Bandarawela. We had the impression that the importation of kerosine oil in cases (oil-tins and cases coming from Russia principally, but a certain quantity from America) was due to the greater convenience of carriage of the case oil to certain districts not at present served by railway; but we learn that the Tin-making Factory at Kochchikade now turns out as many as 1,000 tins a day, to meet the demand we speak of. This industry, together with the other work done at the Installations, altogether requires a staff of 115 men—so that we have, in this entirely new industry, a great addition to the means of livelihood in the Northern division of Colombo where at one time some of our largest and busiest coffee stores were situated.

As regards Liquid Fuel, for which there is also a large Storage Tank Installation at Kochchikade, adjoining but quite separate from the Bulk Petroleum one, although there are now some ten regular local consumers, the demand has not yet developed to the point it may be expected to reach, after proper trials have been made by the railway, and other large fuel consumers, and several of these trials, are to be begun very shortly. We learn that the Company's steam-hopper "Attaka" recently made a trip to Jaffna, and on the way up burnt 14 tons of Cardiff coal, and 6½ tons of liquid fuel returning—which at the relative costs of the coal and fuel, shows a very large saving by use of the latter. Up to the present, the Company's own steamers have been the chief sea consumers, but certain other large lines are getting some of their steamers adapted to use it, and the German war ship "Fürst Bismarck" took a supply here on her way to China.

So far, all the Bulk Petroleum imported into Ceylon, has come from Russia but the liquid fuel is from the Company's lands in South Borneo, where a very large amount of capital is being spent in developing the concession which is held from the Dutch Government. As the large refineries erected there get into full work, it is expected that the greater part of the Company's Eastern trade will be supplied with refined Bulk Petroleum from there. Very large shipments of liquid fuel have already been made, from the Com-

pany's South Borneo ports, to Singapore, Hongkong, Bombay, Madras, Calcutta, Suez and London, as well as large cargoes of Solar distillate for gas-making purposes and other petroleum products to London.

The Company has Bulk Petroleum Tank Installations in full work, at Suez, Karachi, Bombay, Colombo, Madras, Calcutta, Penang, Singapore, Bangkok, Hongkong, Shanghai and other China ports, Nagasaki, Kobe, Yokohama, with liquid fuel storage tanks, as well at Suez, Bombay, Colombo, Madras, Calcutta, Singapore, and in process of erection at Sydney, Melbourne and several other ports. Most of these are very much larger than the Colombo Installations.

COFFEE AND TOBACCO.

For the benefit of intending coffee and tobacco planters in Rhodesia or other parts of South Africa, Mr. Jackson, Keeper of Museums, Kew Gardens, has given the following list of books: —"The Coffee Planter of Ceylon," by Sabonadière (Spon); "Coffee Planting in Southern India and Ceylon," by Hull (Spon); the article on "Coffee" in Spon's Encyclopædia: "Liberian Coffee in Ceylon," published at Colombo by Messrs. Ferguson (1878); "All About Tobacco," Messrs. Ferguson, Colombo (Agents: John Haddon and Co., Bouverie-street, London, E.C.) the article on tobacco in Spon's Encyclopædia —*Globe*, Nov. 9. —[Strangely enough Mr. Jackson omits the latest and most complete work on Coffee, namely "The Coffee Planters' Manual" compiled by J. Ferguson (1899 edition) with a special chapter on "Pulpers" and other machinery—copies of which are also to be got at Haddon's.—ED. *T.A.*]

GERMAN RUBBER ASSOCIATION.

The German Rubber Goods Manufacturers' Association held its annual meeting at Frankfort recently. Forty factories are represented in the asscciaion, of which sixteen employ under 100 hands, sixteen employ between 100 and 500, and eigth employ over 500. All important German concerns are connected with the institution, which wields a powerful influence. The Association has been consulted by the Government about the new tariffs to be arranged this year.—*Chemist and Druggist*, Nov. 10.

THF LINNEAN SOCIETY.

"PATENAS" (?) IN AFRICA.

The opening meeting of the session was held on Thursday evening, last week, at the Society's Rooms, Burlington House, Piccadilly, W., Professor Sydney Howard Vines, F.R.S., President, in the chair.

The closing paper, Mr. J E S Moore, dealt with the origin and character of the "park lands" of Central Africa, and was illustrated by a series of lantern-slides. These park lands in the Tanganyika have quite the appearance of having been formed by the hand of man, but are really natural growths due to the fact that light surface soil has been laid down over what Mr. Moore takes to have been lake deposits. Any given line of country will show large plantations, with quite a homelike look, separated by grass lands; and, as Tanganyika is approached, they dwindle in size till they consist of a few shrubs, overshadowed by giant euphorbias, cactus-like in appearance. Then come stretches of grass, dotted with euphorbias, and, last of all, the salt steppes by the Lake, which is now held to have had at one time an outlet to the sea. Mr Moore's explanation is that, at first, only the euphorbias would grow on the salt steppes; but as these sprang up they afforded a shade and shelter to self-sown shrubs, each of which, as it established a footing, contributed to the natural planting of the area by the distribution of its seeds, till this process reached its highest development in the large plantations where the shrubs overtopped the euphorbias to which they owe their growth.—*British and Colonial Druggist*, Nov. 9.

TONGALAND SUGARCANE.

Mr. B Colenbrander, Magistrate, Ingwavuma, in his district report to the *Agricultural Journal*, writes: During the summer of 1898, I planted at this Magistracy, which is almost 3,000 ft. above sea level, a small portion of ground with what appeared to me an unknown species of sugar-cane, obtained from Tongaland, as I had never observed the same cane growing amongst the many plantations on the coast. The cane which is very juicy, does not grow to any great thickness, and has a light yellow surface, turning into a deep brown whenever exposed to the sun. It has thrived very well, especially under the unsatisfactory circumstances and in the unsuitable locality in which I planted it, and appears very prolific. I have counted as many as 63 sticks to one stooe.—*Natal Mercury.*

THE GOVERNMENT DAIRY.

The Government Dairy is now in its seventh year. The Dairy herd was free from any form of contagious disease in 1899, and there were but six deaths for the twelve months, three among the cows and three among the calves. This is an excellent record considering the size of the herd. Thirty cows and three bulls were purchased at a cost of R4,561·86, while twenty-nine cows and two bulls and fifty-six young animals bred on the farm were sold for R4,337·26. Milk to the value of R21,895·64 was supplied, of which R4,823·07 worth had to be purchased to meet the demand from the hospitals, which at different periods required more milk than the Dairy was able to supply. The necessity for the purchase of milk remains a serious defect in the management, and the only way of avoiding it seems by the Dairy arranging with the Medical Department to supply only as much milk as it (the Dairy) produces. It should be possible to make a monthly forecast of the milk that the Dairy can supply under normal conditions, so as to permit the hospitals to arrange beforehand for the supply of milk in excess of the estimated quantity.

"VENESTA" TEA CHESTS.

"Venesta, Limited," London, are anxious that it should be known among Ceylon tea planters, buyers, exporters, etc., that a circular recently issued by some large home buyers declining to purchase tea packed in certain "veneer" chests, did not refer to the "Venesta Tea Chest" which is an entirely different package to the chest referred to, and does not resemble it either in lining or construction.

INDIAN TEA ON THE CONTINENT OF EUROPE.

MR. HARRINGTON'S REPORT.

There appeared to be a feeling (in India) that the American tea trade required special efforts no longer, but only ordinary business enterprise; that the Special Commissioner who had worked things up there might now do greater service elsewhere, and that the tea trade of the United States might, without prejudice to the interests of tea-planters in India and Ceylon, be left to the American tea-dealer, aided or encouraged in some particular ways by the Associations referred to above. How far this idea was correct remains to be seen. A change of programme was introduced. The "American Fund of the Indian Tea Association" became the "American and Foreign Market Fund," and the Association declared in favour of the policy of canvassing vigorously for the lion's share of the existing tea-trade of Germany, France &c., and advocating tea in preference to the rival beverages, coffee and cocoa. Accordingly, Mr. John E M Harrington was appointed special "tourist" to the Indian Tea Association (Calcutta and London) and on the 20th March last was instructed to make a tour through various parts of the Continent of Europe with a view to (*a*) ascertaining by enquiry on the spot the present position and statistics of the tea trade in each country visited and (*b*) to report as to the most practical method of developing both the taste for tea in general and the demand for Indian tea in particular. It was a somewhat "large order," but the absolute necessity for some such investigation as was undertaken was shown by the fact that, whereas in the British Empire some 90 per cent. of the tea consumed is British grown, in all the States of Europe practically 90 per cent. is supplied by one or more of the following producing centres:—China, Japan and Java, less than 10 per cent. falling to the share of India and Ceylon.

The space at our disposal will not admit of a detailed review of Mr. HARRINGTON'S interesting and instructive Report on his tour. The route followed included Italy, Turkey, Bulgaria, Austria-Hungary, Germany and Holland, and the time occupied was less than four months. This brief time was evidently fully utilised, for the Report contains a large amount of most useful information. In some respects, it shows previous ideas as to the potentialities of some of the above countries as tea-consumers to be open to revision; but, generally, it may be said to confirm the opinions we expressed long ago, that there is a market to be had on the Continent of Europe, but that it is not to be had for the mere asking. Success can only be achieved by systematic effort and a certain amount of outlay. It is not a case of advocating the merits of British-grown teas in tea-drinking countries where peoples have a natural inclination to give the preference to products of portions of the Empire to which they belong. The work that has to be done is to popularise tea among peoples more accustomed to drink coffee, cocoa, beer or wines; among peoples largely prejudiced against, rather than predisposed in favour of, British products, and in countries where tea is to some extent heavily handicapped by local fiscal tariffs. These are conditions that preclude the hope of more than slow progress even with the most determined effort. Mr. Harrington's Report shows that there is ground for this hope, and on the whole, it may be regarded as more encouraging than it was, perhaps, generally expected to be. Facts and statistics are given, suggestions are made, and the future will depend largely not merely upon the action taken upon the extent to which planters provide "the sinews of war" so essential to success in the conduct of a campaign such as that which the Indian Tea Association has undertaken. Conditions vary not only in different countries, but in different towns in the same country. For instance, Mr. Harrington writes less hopefully about Naples than about Rome, in which latter place there are more English and American travellers and a larger fashionable Society to follow the general example of such Society in other countries and adopt "Afternoon tea" or, as the French say, the "five o'clockie." Turkey offers a fair field, and, moreover, does no small amount of "transit" trade on behalf of Southern Russia and Persia. Low sorts are most in favour and long wiry leaf has a preference in the Persian trade, where Camel transport tends to break up the tea. Bulgaria is mostly a coffee consuming country, the tariff on tea is high, and the language and trade customs are difficulties to the British trader. Mr. Harrington cannot recommend direct expenditure of time or money upon so small a field, but thinks the market may be reached indirectly from Constantinople. As regards Austria-Hungary, various difficulties are pointed out, and it is remarked that "no practical method is apparent by which Indian tea could be rapidly and successfully introduced." Very different is the case with respect to Germany, where Mr. Harrington thinks a good trade might be developed if proper arrangements were made and a liberal outlay faced for the first three or five years.—*Madras Mail*, Nov. 26.

A BRAZILIAN RUBBER PLANTATION

(To the Editor of the *India Rubber World.*)

Is it possible to find in the United States, or elsewhere, some one who would be interested in a plantation of Ceara rubber? In March, 1899, we established a plantation in the state of Pernambuco, about 12 kilometers from the capital, where we now have more than 100,000 trees of *Manihot Glaziovii*, vigorous and growing well. Having now, however, other needs for our capital, we should be willing to sell the plantation, though our preference should be to retain our present interest in it, provided parties can be found to join us as partners, or found a company, with a view to supply the money needed for meeting the expenses involved during the few remaining years, until the trees become productive. The plantation really promises a very handsome profit. The estate is now in fine condition, with laborers' cottages and stables built by us, and pasture land fenced in and stocked with cattle. The location is healthful and only about 3,000 meters distant from a railway station. The extension of the railway past the estate is projected.

Within three or four years the trees are expected to begin yielding from 1 to 3 pounds of rubber per year. The labor of gathering the crop will be slight, because the trees will simply be tapped and the rubber will coagulate on the trunk, when it can be pulled off dry. With the monthly expenditure of $500 to $1,0 0, not only can the plantation be kept in condition, but, within two years, our original plan of increasing the number of trees planted to 500,000 could be carried out.

We prefer for the present not to publish our names in this connection, but will be pleased to have this appear in The *India Rubber World*, and to have you receive for us any correspondence which may result. M. & Co.

———, Brazil, October 1st 1900.

ESSENTIAL OILS.

From Semi-Annual Report of Schimmel & Co. (Fritsche Brothers) Leipzig, New York, London, for October 1900, we take the following:—

CINNAMON OIL, CEYLON.—There has been an exceptionally large demand for this article, to satisfy which we have been carrying on the distillation without interruption since the beginning of the year. The prices of the best qualities of chips fluc-

tuated between 3⅛d and 3½d per pound. In view of the animated condition of the cinnamon market, there is absolutely no prospect of a return to the previous values. The shipments have been enormous. The aggregate for the first seven months of this year comes to not less than 900,672 pounds, of which nearly one fourth has been acquired by our firm. The distillation of the finest quality of heavy, sweet, cinnamon oil is one of our specialties.

Citronella Oil.—Since the publication of our previous Report, the value of this important article has suffered a further decline, and it would appear that the supply exceeds the consumption. The statistics again show an important increase in the production. Recent quotations were a shade under ten pence, and were the lowest on record. This oil is largely employed for perfuming benzin and mineral oils, and it might also be found very useful for lac and oil paint. The Java variety of citronella oil has found great favour, and in fact is fully entitled to be called the elite-quality. Its effect in the better qualities of soap is striking, the natural explanation being its high content of geraniel and citronellal.

Clove Oil.—The information given in our last Report, as to the unsatisfactory result of the last clove harvest in Zanzibar and Pemba, has since been confirmed. The total yield is estimated at about 50,000 bales, or say 3,000 tons, as compared with 140,000 bales or 8,400 tons in 1898-99. The cultivation of cloves is also undoubtedly influenced by the state of the labour market, which has gradually taken a very favourable turn since slavery was abolished on both islands. At the present quotations cultivation has become unremunerative, and it is bound to decline still further, so as to harmonise with the consumption, for the lower values are simply due to the continued overproduction and the piling up of non-realisable stocks in Bombay, London and Holland. The latter, taken together, are so important, that it would require several bad harvests to equalise the surplus.

RUBBER PLANTING IN SUMATRA.

In answer to enquiry addressed to the St. Petersburg Company, the following letter has been received from its president, dated in Prussia :—

To the India Rubber World—Gentleman : The Russian-American India Rubber Company, of St. Petersburg, Russia, has sent me your favour of August 20th, because it is not my company, but myself who is going to make a trial on a large scale with *Ficus elastica* plantation in Sumatra, east coast. As all experiences are to be made, I am sorry not to be able to give you any further informations for the moment, except that there will be planted about sixty thousand trees per annum, beginning from this year.—I remain, gentlemen, very truly yours,

Fred. Krauskopf.,
President Russian-American India-rubber Co.
Villa Hohenbuchen, bei Schlangenbad Wiesbaden, September 18th 1900.

TRAVEL IMPRESSIONS OF A JAVA PLANTER IN CEYLON.

SOIL—VEGETATION—PLANTING—CACAO—COFFEE—CINCHONA—TEA—COCONUTS—RUBBER.

Mr. J. Bley writes in *Teysmannia* as follows :—

In journeying to Europe I stayed a fortnight in Ceylon and had, thanks to good introductions, the opportunity of seeing a pretty good number of the various cultures; the time was too short however to permit of thorough studies. Ceylon is such an interesting island, that I can assure every colleague, that it is well worth the trouble to visit it. Travelling is everywhere united with expense; if one has not the money to spare for the extra excursion, let him travel in the (very good) second class of the "Norddeutscher Lloyd" or of other good lines, instead of in the first : thereby one saves enough money for the trip. The objects worth seeing in Ceylon are situated comparatively close together, the railway communication is good, and even without being introduced one sees much of interest; it is only needful to be able to speak a couple of words of English.

Country.—Ceylon has in the southern portion very few lowlands of importance for cultures, so that there is little land there suitable for rice, native sugar-cane and such like cultures. Travelling by rail from Colombo to Kandy and the terminal station, Bandarawela, one reaches pretty quickly a considerable height (6,300 feet) through difficult hill-country. One misses, however, the volcanoes with which in Java we are so well provided; Adam's Peak alone has the same form, but does not appear to be of volcanic origin. One might very well think this of the high lying sanatorium, Nuwara Eliya. The country and the kind of soil are there very like the Diëng plateau. The land also has something of the look of the Djampang districts in the Preanger, only it is wilder and rockier.

The Soil of the districts that I saw consists almost everywhere of granite and quartz rocks with a very thin layer of poor earth above; the estates near Nuwara Eliya form an exception to this. They cannot, however, be compared with our good Java soils.

From the nature of the case it is not possible in such a short time to form a judgment of the Climate. I was there in the dry monsoon; according to the rain statistics the rainfall in the southern portion of Ceylon appears to be pretty much the same as in Java; it seemed to me, however, that it is there hotter at an equal height.

Land Tenure.—The land is freehold; consequently there is no emphytensis or ground-tax paid for it, which has greatly facilitated the transition to other cultures. If anyone wishes to have waste-land, he applies for a piece; it is inspected by the Government and the forester, who fix a minimum price for it, for example ƒ10. When it has been mapped out by the surveyor, it is put up for sale and sold to the highest bidder. If this is another than the first applicant, then he must repay the cost of measurement, &c. Lands belonging in freehold to natives may also be bought.

The Vegetation is poorer than in Java; it is striking that so little bamboo grows there; that which is found there is almost entirely *bamboo ampel* and *bamboe petoeng*;* the native houses are consequently built of brushwood and mud.

Woods are seen here and there, but no large trees, so that timber, wood for tea chests, &c., must be imported. Perhaps the Netherlands colonies might be able to find a market there for wood. Good pasture-land is also not readily available, so that guinea-grass and *roempoet petoengan* † or *kàlăndjănă* ‡ are planted. Singular

* *Bambusa fera* and *B. nigrociliata*, *B. aspera* or *B. gigantochloa aspera*.

† Mal. *rumput*, grass; *petoengan* I cannot explain.

‡ I cannot explain this.

is the contrast, when one comes through one of the many tunnels near the terminal station, Bandarawela, where the drier northern portion of the island begins. In place of jungle and undergrowth one suddenly sees the hills covered with clumps of short grass, which however does not appear to be suited for cattle fodder.

The Botanic Garden at Peradeniya is very fine, but not what the garden at Buitenzorg is; the European staff then consisted of only two persons and a third was just expected. The grouping of the plants, it is true, appears at first sight very picturesque; but when one looks for a particular plant, one sees at once the great advantage of the systematic method of planting at Buitenzorg. In addition the guides by their English-Sinhalese pronunciation of the Latin names makes them even more unintelligible than the Javanese *mandoer*, * who translated cinchona calisaya into High Javanese as "*kina lepen koelo*."

Very beautiful in blossom certainly stood *Magnolia* sp. (Himalaya) with large white flowers, which should certainly suit the taste of our Javanlings [*Javantjes*]; further *Poinciana regia*, the flamboyant of Madagascar, a handsome blue-flowered shrub, as also the "cannonball tree," so named from its shot-round fruits, &c., &c.

POPULATION AND LABOR. — The indigenous population of Ceylon are the Sinhalese, who appear to have just as little inclination for manual labor as for instance the Malays of Sumatra. For the work on the plantations and in the factories therefore Tamil coolies from British India are generally imported. The pay per day is usually for men 35 and for women 25 rupee-cents, equal at the ruling rate of exchange to about 30 and 20 of our cents. The coolies have frequently *f* 50 and more of advance, may leave the estate, but are then obliged to repay the advance, unless according to a common custom it be taken over by another estate.

As may easily be understood, it is in the highest degree difficult to exercise control over them. Their skill and industry appear to be about the same as those of our Javanese and Sundanese. The planters generally converse with the coolies in the Tamil language, but to a strange it sounds unpleasant with an English accent. One finds everywhere however natives, and especially Sinhalese, who know some English, more even than in Java, who understand Malay, which is certainly an advantage for tourists.

The people are more lomquacious, more bustling and dirtier, but also more brutal—which generally see, to go together—than our Javanlings.

MEANS OF TRANSPORT AND CATTLE-BREEDING. —The railway transport is both for persons and goods considerably cheaper and consequently the night trains also more comfortable than in Java.

On the other hand, Ceylon has railways and tramways only in the industrial portion. The postal service appears to be cheaper and better managed than in Netherlands India, but of telephone communication, even in the towns, there is hardly any. In the principal places and at the hotels one can hire carriages, drawn by big Australian or Persian horses, pretty much for the same prices as in Java. There are also jinrikshas drawn by Tamil coolies. The typical method of transport for persons in Ceylon is however the little carts drawn by dwarf-oxen.

* Jav., overseer.

One sees big *deelemani* * carts with two oxen, but many more hackeries [*karretjes*] and bandies with one ox in front, which go almost as quickly as horses. The transport carts are drawn by large Bengal oxen evidently imported; on account of the rocky ground all the horses, as well as *sappies* † have iron shoes. A singular custom of the carters is to brand entire designs on the beasts and often to furnish the horns with brass tips. It is said that several planters have tried to breed horses, but the results were bad. All the horses bred there were small, weak and often albinos, which must probably be attributed to the bad food. The horses are fed with feed imported from Australia or with plenty of *gabbah* ‡ and some locally grown grass; the *sappies* with paddy straw, pressed cakes from the coconut oil mills and grass, when that is to be had, which is often not the case.

The roads are excellently traced and hardened with broken stone, but sometimes terribly narrow and the turns pretty sharp. It must have cost an amazing amount of work to cut the roads out of the rocks. An interesting and efficient means of transport is on many estates the "shoots"; these are cable lines of the very simplest construction for the hill transmission of produce and firewood. A steel rope of ¼ to ½ English inch diameter is, preferably without any other support, stretched to one post or more, often high above ravines and roads. On this the load is hung by a light pulley, or in the case of a very great incline simply by a hook, and then runs down by its own weight to be taken up below. The pulleys are then pulled up again by persons for further use. This method of transport is not used for fragile articles, but for fresh tea leaves, coffee, firewood, &c. Nothing can be sent uphill by the "shoots"; for that purpose however I saw the well-known cable lines driven by water-power: the contrivance is however very expensive. The firm of Walker Sons & Co. have erected many "shoots" and cable lines.

The fresh tea leaf is also transported in large baskets, provided with divisions to prevent drying, and in open-worked sacks of coco yarn, which are lighter and stronger than gunny bags.

CULTURES.—One stands amazed at the energy with which our neighbours undertake their experiments in cultivation, and one also comes to the conviction that English capital must be much easier or stronger than Dutch, or otherwise it would have been impossible in Ceylon to have been able to go over completely and entirely from coffee and cinchona to the cultivation of tea. One sees now and then indeed just as here and there in Java the "whole grocer's shop" system carried out; I saw, for instance, planted amongst each other—tea, cacao, Arabian and Liberian coffee, two varieties of caoutchouc, pepper, cinchona &c.; as a rule however only tea is planted.

COFFEE.—This culture seems to have pretty well been done with; at least I saw very little Arabian coffee left, and Liberian coffee does not appear to do in Ceylon, which is probably chiefly due to the shallow soil.

CINCHONA I also found almost non-existent, and what I saw was of inferior variety. It is true that there seems to have been a

* I do not know what this means.
† Jav. *sapi*, oxen.
‡ Paddy ?

rush to buy good Ledger seed from Java, but the necessary care does not appear to have been taken everywhere bestowed upon it, so that very little seed germinated. I certainly saw no soil that I should judge suitable for Ledger; we need not therefore be very anxious regarding the competition of Ceylon; there is, however, much cause to fear that we in Java will ourselves again ruin the market by too great planting. What is still harvested of cinchona bark is for the most part sold in Colombo on account of the German firms and despatched packed in square bales.

TEA is now the chief culture of Ceylon. It is planted from somewhat above sea-level to over 7,000 feet and on every sort of soil, even upon rocks. Only on two places did I see no tea planted, namely on the roofs of the factories and between the railway rails; everywhere else I saw tea on flat ground and on slopes only accessible for rock-goats on pretty deep yellow-brown soil (good exception) and on soils ½ to 2 feet deep above solid strata of granite and quartz, nay even on bare rocks each bigger than a factory, in fact everywhere where there is a crevice of a finger's breadth or a handful of quartz gravel, which has the appearance of the government salt with us, tea has been planted. Each planter has his own opinion regarding method of planting and manufacture exactly as in Java. The most widely planted is the small-leaved Ceylon hybrid; I saw also, however, indigenous Assam or what came very near to it; it is found that a little hybridisation makes the plants stronger. Rust (helopeltis) and other diseases I saw little of, though I understood that borer, red spider, &c., were experienced.

THE DISTANCE BETWEEN PLANTS varies from 3 into 4 to 5 into 6 and 7 feet; on high-lying grounds the conclusion has been arrived at that one must not plant too closely. Planting is generally in strait lines without terraces and without following the configuration of the land. On sloping grounds open drains without banks are cut in an almost horizontal direction. The ground is generally weeded quite clean or entirely surface-worked with the *patjoel**; blind drains or deep working of the soil as in Java I never saw practised. The ground is often therefore as hard as *padas*†; but it must not be forgotten that the large quantity of gravel gives a natural drainage. It seems strange to me, that nearly everywhere rows of SHADE TREES are planted along the boundaries and at distances of 50 to 200 feet throughout the estates, usually *Grevillea robusta*, and on higher lands varieties of *Eucalyptus*. The object of this is to break the winds, and also to obtain firewood, which is very scarce; moreover many planters on low-lands find light shade useful for tea.

Much more care seems to be bestowed in Ceylon than in Java upon systematic pruning; I believe that to this and to the excellent climate must be ascribed the good yield per acre. Pruning is done branch by branch with pruning-knives somewhat larger than those we use for the coffee, and the aim is to cause the bush to increase in breadth from below upwards; knots on the branches are not allowed to remain, but otherwise different systems are followed. On high-lying lands for instance heavy pruning is carried out once in four years and then three months left before plucking; on low-lying lands in shorter periods.

MANURE.—They have begun to recognize in Ceylon, that the very poor soils need manuring, and since stall manure is only exceptionally available, experiments are being made with "*boengkil*,* fish and tea manure." I was shown an old China tea garden, the production of which was, so it was said, brought up from 400 pounds to 1,200 pounds per acre, by putting into the ground every other year 80 rupees worth of manure, beside the cost of transport.

PLUCKING I saw was the three leaves about every ten days; the women have for this a large basket on their back, which is suspended by a string over the head. The plucked leaf is often collected in the garden and then transported to the factory. (See *Means of Transport*.)

The TEA FACTORIES are mostly built with a more liberal hand and more all of a piece than in Java. The buildings are larger and especially higher, often two to three stories. Where it is in some measure possible, water-power is employed and then mostly turbines, so necessary with the help of steam and petroleum machines for the dry season. The buildings and machinery are generally erected by firms like Walker, Sons & Co., Ld., and others, who also supply all other needful appliances. Building oneself is much less in use than in Java. The wood is imported from Canada, Burma, &c., and iron joists are also much used.

WITHERING.—Withering is carried out much more thoroughly here than in Java and generally artificially in lofts. *Tampirs*† are not used for withering; it is done on shelves that are generally filled in with "Hessian cloth," a kind of fine gunny stuff either flat or, for the more convenient filling and emptying, sloping and also in such a way that one end can be loosened; the cloth is then rolled up each time, and the work goes on in that manner by means of trained labor more rapidly (one woman per 100 pounds leaf). I also saw shelves with their planks and also with loose meshes of yarn. Each one finds his construction the best, if more goes on it.

ROLLING is done twice, thrice or even four times; thrice is the most usual, that is to say, the leaf is first rolled with little pressure ½ to ¾ hour, then sifted in the roll-breaker, the large leaf again rolled ½ to ¾ hour, sieved, &c.; the times for the different rollings varies much.

FERMENTATION is often entirely omitted on low-lying lands, prolonged rolling being sufficient. On higher lands however fermenting is well done and then often in rooms that are kept cool by means of ventilators and wet curtains.

RE-ROLLING after fermentation seems to be no no longer usual, only on a high-lying estate the tea is first rolled for half-an-hour (in the dry season ¾ hour), then fermented 1½ to 2 hours, and after that only the coarse leaf re-rolled ¾ hour (in the dry season one hour)

For DRYING all kinds of dryers are in use; I saw mostly the "Paragon." SIFTING is mostly

* Jav. *pachal*, hoe, mamoty.
† Solidified earth.

* Oil-cake poonac.
† Jav. *tampah*, fan.

done with the oscillatory sieves of Jackson or Walker, the coarse leaf is cut with various sorts of "cutters," mostly "Parnalls" and "Jackson's." The usual mechanical packing is done to a small extent in chests made by the natives, for the most part in chests half an Eng. inch thick of so-called mommi [*sic*] wood, imported from Japan, sawn to scale and provided with dovetails. Chests are also imported from Canada ⅜ inch thick and consisting of three layers of wood glued together, that apparently is cut mechanically and not sawn. They are provided with tin corners, clamps for the lids, etc, and cost in Colombo R1·30 net. Compressed steal chests seem to be very little used now.

PROSPECTS OF TEA CULTIVATION.—I believe that in Ceylon pretty well all suitable ground is planted with tea; it is true that some gardens have hardly come into bearing, but on the other hand many old gardens are retrograding in quantity as well as in quality of crop, so that one would judge that the top point of production has been reached, unless it should appear that manuring on a large scale gives the results that many expect from it. The produce will certainly not, however, be cheaper thereby; and when one sees how readily consumption takes up the large quantities of Indian tea, one is convinced that there will still remain a place also for the product of Java, Whether planting is being greatly extended in Assam and India I could not learn. I was told, that only young men are being engaged as superintendents, who have studied some years as engineers, a hint for our young men, that it may come to that in Java,

CACAO is still pretty largely planted in Ceylon. I visited an estate near Matale, the centre of the cacao industry, and saw also here and there smaller plantations. A red variety is mostly planted, which greatly resembles the Java sort, only the fruit is somewhat darker violet-red and the streaks more greenish; experiments are also being made with other hardier varieties. All the diseases that we have on the cacao in Java I found also here, such as stem-borers, large borers in the fruits, and also stem-canker, which does much harm and which is attempted to be cured by cutting out the bark and by coppicing. What I did not find was the dreaded disease in the fruits, which threatens to annihilate cacao cultivation in Java. I saw cacao being dried in sheds, the drying floor of which was made of laths, covered with cheap coconut fibre stuff, which seems to answer well.

VARIOUS BYE-PRODUCTS.—Here and there one sees pepper, indiarubber, etc., planted, but they seem more to be experiments. Kapok* is everywhere grown by natives, but experiments to plant kapok on a large scale do not seem to exist. The product is bought and exported by European mercantile houses, but the qualitty appears to be inferior.

COCONUT INDUSTRY.—It appears that this industry in Ceylon is on low lands a counterpart of the tea industry on the high lands, but it is extremely difficult to obtain any information regarding it. The nuts mostly grown appear to be the same varieties as in Java, viz. *klappa-idjoe*† and *merah*‡; other kinds are also found. From of old oil has been expressed by the natives from the coconuts in mills driven by *sappies*, of the same system as the *kadjang*§-oil mills in the Solo district, only larger and heavier. Later on hydraulic presses and crushing mills were erected by Europeans and wealthy natives, and copra exported which is generally packed in square bales.

DESICCATED COCONUT.—An entirely new industry has sprung up in the last few years in the manufacture of dried coconut preparations, which seem to be chiefly used by confectioners. I just managed after much fruitless effort to gain admission to one of these factories. The course of manufacture is as follows:—The nuts come to the factory deprived of their husk, are cut in quarters by a circular saw, the flesh of the fruit is extracted with a chisel, then deprived of the brown skin by a kind of plane and further cleansed with a file, and the pieces washed first with warm and then with cold water. The cleaned nuts are then either cut in slices in machines constructed for that purpose, or rasped in another kind of machine. In the first case one obtains slices, in the second case coarse flour; both are dried in a drying-machine just as tea is; the flour is so sifted, that three kinds are obtained and packed in tea chests with tea lead. In the factory that I saw this was done by means of a tea packing machine with a screw-press on it.

COIR.—Another important industry is the manufacture of mats, bags, etc. of coconut fibre (coir), but I was not able to obtain permission to see it; only I heard, that the fibre and the raw yarn are prepared as a domestic industry by natives in the district between Colombo and Point de Galle and sold to the factories, which work it further with hand-looms.

ALOE FIBRE.—I was present at an experiment with a machine for the cleaning of aloe (agave) and other fibres. The machine worked in the same way as the Faure machines, only the leaf was mechanically put into and out of the machine. It appears that this industry is there still in the region of experiments, just as with us. In conclusion a word of thanks to the gentlemen who afforded me the opportunity of seeing so many interesting things in so short a time.

* Silk-cotton.

† Jav. *kalapa ijau*, green coconut.

‡ Mal. *merah*, red.

§ *Cojanus indicus*? (*Lochang* is the Jav. name for pulses in general.)

COTTON PLANTING.—With a Cotton famine and its tremendous consequences to British trade and manufactures almost in sight, it is amazing how little is done to attempt to supplement supplies. With the exercise of a little energy and expenditure of some capital there is no reason why Manchester should not emancipate itself entirely from its present state of dependence on United States' supplies, liable to be cut off at any moment. Cotton could be grown in the north of Brazil to clothe the whole world and, if undertaken on a large and comprehensive scale, probably at a much cheaper rate. Labour is certainly far cheaper here than in the States, whilst the advantage of a depreciated currency in such a competition is likewise not to be despised. The cotton growing States are moreover the most densely populated of the country, Alagoas coming second in this respect only to the Capital itself. A powerful association for the plantation of cotton in the Northern States could not fail to be as profitable to planters as advantageous to home manufacturers if properly undertaken, and deserves to be seriously considered.—*Brazilian Review*, Oct. 23.

THE STATE OF AMAZONAS (BRAZIL) AND THE RUBBER INDUSTRY.

The State of Amazonas, the greatest in area of the United States of Brazil, lies between longitudes 74° W. 54° W., and between latitudes 4° N. and 10° S., having a total area of about 600,000 square miles. It is bounded on the north by British Guiana and Venezuela; on the west by Columbia, Peru, and Bolivia; on the south by the State of Matto Grosso; and on the east by the State of Para.

On the north and west frontiers there are some highlands and plateaux, but for the most part the State consists of vast, low-lying, forest-clad plains intersected by the innumerable tributaries of the River Amazon. These rising in the Andes, converge to the main stream of the Amazon, named in this State the Solimoes. Flowing as they do, through flat country, their course is generally extremely sinuous, and their current sluggish. The course of the main stream, on the contrary, is comparatively straight and the current swift, that is to say, about four miles per hour. Flowing from west to east the Solimoes divides the State into two, about equal, parts, and forms a most important highway for commerce between Para, situated at the mouth of the Amazon, Manaos, the capital of the State of Amazonas, and Iquitos, situated in Peru, being navigable as far as the latter part at all times of the year for vessels drawing not more than 12 feet. The distances between Manaos and other points on the Amazon and its tributaries will be found in Tables Nos. 1 and 3.

It is noticeable that the majority of the larger tributaries of the Solimoes, namely, the Javary, which forms the boundary between Brazil and Peru, the Jutahy, Jurua, Purus, and Madeira, flow from south to north, whilst only one large tributary, the Negro, and two smaller, the Japura and Iga, or Putumayo. enter the main stream from the north. Although no mountains occur until the extreme north and west frontiers of the State are reached, yet, on the whole, the part lying to the north of the Solimoes is considerably higher and less swampy than that lying to the south. On the Upper reaches of the Rio Branco, a tributary of the Negro, large grass-covered plains, known ocally as "Campos Geraes," occur, on which a considerable number of cattle are raised. For this very reason, however, that part of the State is at present of less value, and is less explored than the southern part, where the immense tracts of swampy land produce the invaluable "Hevea Braziliensis," from which the rubber is extracted.

The recent report of the British Vice-Consul at Manaos, from which the above description is taken, says that it may indeed be said that the whole commercial importance of the State depends upon the extraction of rubber which is the paramount native industry.

The following tables show (I.) the distance from Manaos to the ultimate ports on various rivers, and (II.) to Para and to various ports abroad, and (III.) an estimate of the total world's supply and consumption of rubber:—

The State of Amazonas (Brazil) and the Rubber Industry.

I.

MANAOS TO—	DISTANCE.	RIVER.
	Miles.	
Sto. Antonio ...	697	Madeira.
	Days.	
Alto Acre ...	39*a*	Purus
Bocca do Breu ...	50*a*	Jurua
Ouro Preto ..	21*a*	Jutahy
Bocca do Jaquirana ...	20*a*	Javary
Pongo de Manseriche ...	24*a*	Solimoes
Camanaos ...	8*a*	Rio Negro
Boa Vista ...	10*a*	Rio Branco

a Steaming from Manaos.

NOTE.—The number of days includes those spent at at various points called at during the voyage.

II.

MANAOS TO—	DISTANCE.
	Miles.
Para	86
Lisbon	4.14
Havre	4,90
Liverpool	5,149
New York	4,240

III.

Production of Rubber.

PRODUCING COUNTRIES.	ESTIMATED QUANTITY OF RUBBER PRODUCED ANNUALLY.
	Tons.
Amazon district (Brazil, Peru, Bolivia) ...	25,000
Rest of South America	3,500
Central America and Mexico	2,500
Java, Borneo, and Eastern Archipelago ...	1,000
East and West Africa	24,000
Madagascar and Mauritius	1,000
India, Burmah, and Ceylon	500
Total	57,500

Consumption of Rubber.

CONSUMING COUNTRIES.	ESTIMATED QUANTITY OF RUBBER CONSUMED ANNUALLY.
	Tons.
United States and Canada ...	21,000
United Kingdom	21,000
Europe (excepting United Kingdom)	15,500
Total ...	57,500

[These estimates are, we think, taken from our "All about Rubber," some of the figures being slightly altered and given in "tons" in place of "cwt."—ED. *T.A.*]

THE SUPPLY OF TEA AND LOW PRICES.

(To the editor of the *Home and Colonial Mail.*)

SIR,—In looking through the market reports of the various chroniclers of current opinion on Indian tea one is struck by the ingenuity displayed in accounting for the depression in market values. "The increase in the duty," "The general knock-out," "Irregularity in bidding," "The burden of 6d per lb duty, whilst coffee and cocoa escape at 1d to 2d," &c., &c., every one of which reasons, I venture to think, would not matter in the slightest if the real reason were not predominant, namely, over-supply. It is quite apparent that the self-denying ordinance of last season, or automatic feed regulator, is out of working order; and the old policy of printing tea for public sale on the principle of "Devil take the hindmost" has again been resumed. One broker's circular recognises this by saying that "the quantity offered was in excess of the requirements of the trade." The total number of packages offered in public sale for the whole fifty two weeks of 1899 was about 1,600,000 packages or, omitting five weeks' holidays, an average of 34,000 packages per week. And as for the last six weeks, the market supply has been over 300,000 packages, or 50,000 packages per week, with every prospect of more to follow; the cause of the depression is not difficult to find. It is a maxim in political economy that "limitation in supply is the most powerful augmentor of

value"; and surely the converse is equally true, that over-supply is the most powerful depressor of value. What remedy to propose is not my present object. Buyers find no fault with cheap tea; and if it suits the sellers to let them have it in abundance—well—it's a free country.—I am, sir, yours, &c. D. F. SHILLINGTON.

UNDOUBTED PROFITS ON TEA: WHERE DO THEY GO?

A QUESTION FOR THE "THIRTY COMMITTEE" TO SOLVE.

"Cosmopolite"—an old Ceylon planter—writing on 13th November, says:—

"Glad to see Ceylon is in such a healthy state; hope tea will go up again; for it makes no difference to drinkers like myself. I pay just the same price for the same quality of tea, whatever the rise or drop of the market may be. So I always pray for a rise, just as a help to my old friends in Ceylon. Where does the difference go? Can't the 'Committe of 30' find that out? Somebody is scooping in the profit that has no right to it."

There can be no question of the great profits attending the distribution and retail sale of teas in the United Kingdom. A minor London Tea-selling Company reports by this mail dividends up to 10 per cent for its last year and from the "A B C" downwards, all such Companies go on prospering exceedingly. Pity that the poorer producers cannot have a share of such profits!

SNIPE SHOOTING BREAKS.

(*To the Editor of the "Asian."*)

SIR,—A certain amount of luck as well as straight shooting is necessary in order to make a long break of snipe. The birds must be collected together in a small space; rise singly and within easy range for the shooter to make a long consecutive run of kills. Of course no one can kill with certainty when there is much walking between shots.

One man I knew shot seventeen snipe running (near Secunderabad I think it was). Another in the vicinity of Barrackpore killed thirty-four snipe in thirty-four shots: he had one miss in his break, but squared matters by knocking over two at one shot. As far as I remember it was his eleventh shot which was the miss.

I should imagine that there must be several men in India who have killed 20 snipe or more consecutively. As a rule unfortunately, the only people who know of feats of this sort are the men who do them; and the better the shot, the more modest the man—consequently many a great deed is lost in obscurity! "FLEUR-DE-LYS."

—*Asian*, Nov. 27.

[The writer of the above we have previously identified with Major G P L Birch R.A., now at Rawal Pindi, stationed at Trincomalee early in the year for a short time.—ED. *T.A.*]

DR. GEORGE WATT'S ANNUAL REPORT of the Economic and Art Section of the Indian Museum for the year 1899-1900—referred to in our Correspondence column elsewhere—contains much useful information respecting cotton, fibres, tea, coffee, timbers, etc., from which we may quote in our monthly later on.

SEYCHELLES WISH TO LEASE ALDABRAS ISLANDS.

The authorities in the Seychelles are desirous of leasing the Aldabra Islands, famous for the turtle, for any period from nine up to thirty years. A few years ago when Mr. Risely Griffith was Administrator at Mahé, he visited the Aldabras, and found the islands in a very dreary and deserted condition. The turtle reigns supreme there, and grows to an enormous size, and it is not improbable that the islands will be leased by someone engaged in this profitable branch of trade If the consumption of turtle in London is to increase in proportion to the accretion of mayors and aldermen, it may be a shrewd investment for some Leadenhall purveyor to secure the lease of the Aldabras. There is regular communication now between London and the Sychelles.—*Daily Chronicle*, November 12th.

A MEXICAN RUBBER PLANTATION.

The statements printed in our last number under the head "Returns from Rubber Planting," relative to the work in Mexico of La Zacualpa Rubber Plantation Co. have been supplemented by a later issue of *The Rubber Planters' Bulletin*, from the company's San Francisco office. In the first place, their resident director (in Mexico), O H Harrison, writes of a new method of preparing rubber from the *Castilloa elastica*, by Enrique Ampudio Chavero, the plantation manager. It consists of the addition to the *latex* of the juice of a plant found on the plantation, resulting in a more satisfactory coagulation than has before been seen in that country. The result is described by Ashmore Russan, an English rubber expert who carried a specimen from Mexico to London lately, as a "perfectly pure and almost white product." Mr. Ashmore says, further: "I consider it equal to the finest Para, that is worth 4s 2d per pound (or say $1 gold). Certainly no Central American or Mexican rubber like the Zacualpa company's has ever been put on the market. It is worth at least 50 per cent more than that prepared by the Indians."

A letter from Mr. Ashmore printed in this Bulletin states that on July 4 last he saw on the Zacualpa plantation a nursery of three acres, said to contain 2,000,000 plants of *Castilloa elastica*, growing so regularly as to suggest that all the seeds planted had germinated. He inspected 30,000 young trees, two years old from seed, growing amid maize and shaded by it, the majority looking healthy and strong. Planted in other areas, also chiefly among maize, were 270,000 other young *Castilloas*, looking well, and Manager Ampudia expected to plant 300,000 more during the season. On the company's old plantation he saw planted trees ten years old being tapped. Some of these he was unable to span with his arms at four feet from the ground, "and few, if any, were under fourteen inches in diameter."

"The men were tapping the trees in the old Indian fashion, but it was probably the last time they would be permitted to do so. Senor Ampudia and his colleague, Senor Lopez, are experimenting with a view to discovering a less murderous, more economical, and more simple method, and as I am quite as keen as they are, I am going to send out some special tools and knives to further their experiments. I think, though, that they have hit upon a method which will enable them to do without machetes and knives. I have a pretty good idea as to what the method is, but at this stage I prefer to say nothing more about it."

Mr. Ashmore attempted to cure some *latex* from *Castilloa* trees by smoking, using a stove and corozal nuts for fuel. "The milk coagulated, but the rubber was very spongy, and the process terribly slow."—*India Rubber World*, Nov. I.

UNITED PLANTERS ASSOCIATION OF THE STRAITS.

CATERPILLARS ATTACKING COFFEE.—*The Chairman* informed the meeting that after very careful consideration the Committee had come to the conclusion that they were not in a position to recommend legislation, and that the Committee proposed with the sanction of the meeting to forward the following resolution to the Government. "That the Committee of the United Planters' Association do not feel disposed to take on themselves to recommend legislation on their own responsibility, but desire to express their great sense of the interest and assistance which the Government have shown in the matter, more particularly in connection with the remedial measures proposed by the Acting Brithis Resident, Negri Sembilan."—*Carried.*

THE PROPOSED APPOINTMENT OF A RECRUITER OF TAMIL LABOUR FOR THE FEDERATED MALAY STATES.—The Committee propose that the salary should be $500 per month as an outside figure, but that that sum should command a really first-class man. As to the method of contribution to the cost by non-Government employers of labour, the Committee proposed a capitation fee of $2 for coolies recruited by the proposed officer and 5 per cent on cash disbursements; in cases where the officer only acts as Agent, he would only charge 5 per cent on cash disbursements, drawing bills upon the employer, at the common usage. That the officer's headquarters should be at Negapatam. That the Committee are not in a position to name any one in particular to fill the post; but that T Heslop Hill's name has been repeatedly mentioned in connection with the matter, and they feel sure that his appointment would meet with the unanimous approval of the planting community

EXPORT OF COFFEE TO EUROPE—Letters from Mr T H Hill were laid on the Table, also a letter from Messrs Sanderson and Co of London being a report on the samples previously sent home

COFFEE—Mr T H Hill says: It is evident that the Malay Peninsula can compete with the Brazils in the cost of production of coffee. In the interests of all concerned the standard should not be left as it now is, viz:—"Fair average of the Season" and at I have already said it will be seen it is unreasonable to expect any one man to be able to deal with the matter, even if willing to face the delay and expense. I am informed that 24 monthly sales would probably suffice and when it is remembered that the export duty on coffee is fixed on a sliding scale, and that the higher standard would pay the higher duty, it appears equally to the advantage of the Government and the Planter that such further standards should be sought for, and the Government might fairly be asked to grant a sum per cwt. towards the expense of the coffee shipped as indicated. The value is advancing and if such should be the case in the future each shipment would result not only in benefit to the members of the Association but possibly in actual cash profit as well. If the two standards are now established in future I believe it would be a step in the right direction to make Liberian Coffee more popular and enable estates to carry on better in times of depressed markets.

SANDERSON & CO.—The chief thing to bear in mind is to take out all the broken and black berries and keep the sample as even as possible in colour, viz. a bright golden yellow or brown, but not dingy and dull. Our present quotation for our fair average picked standard, is 38/—c & f.

THE COMMITTEE had decided to send 5 piculs of coffee to Aden, and to keep 5 piculs at Port Dickson: to test the advisability of storing coffee, the samples having been duly passed. That as an outcome of the correspondence which had been read to the Meeting, the Committee with the approval of the General Meeting had decided to follow Mr. T H Hill's advice: and to forward monthly shipments of 100 cwt. at least to Messrs. Sanderson and Co. to be auctioned in the way Mr Hill suggested. That various planters had already given in their names as guaranteeing shipments for one year. That the management of the experiment was to be in the hands of six members to be elected at the meeting—three from Selangor, three from Negri Sembilan. The Committee to pass all samples, and see that they were up to standard. The coffee was to be sized into two sizes: to be sent to the Port Dickson Coffee Curing Co. who would see to the bulking and shipment, and generally act as Agents.

The following Gentlemen were elected: Messrs. Bailey, Toynbee and Prior from Selangor and Messrs Cuming, Coates and Lake from the Negri Sembilan. It was further unanimously agreed to send a special letter expressing the gratitude of the meeting to Mr T H Hill for all his efforts and recording a vote of thanks passed at the meeting.

EXPERT.—A semi-official letter from the Secretary to Resident General addressed to Mr Carey was next read announcing the appointment of Mr Stanley Arden to superintend the proposed experimental planting, and requesting the opinion of the Committee as to where his headquarters should be, and what suggestions the Committee might wish to make for carrying out his duties. The Chairman reported that the Committee had decided to name Kuala Lumpur as Mr. Arden's headquarters, and that for the present the best that could be done was to carry out the suggestions contained in the semi-final paragraph of the letter of the Secretary to Resident General, which read as follows: "That he (Mr. Arden) should I think, visit all the estates where Para Rubber is largely planted and advise the planters on the subject, and should, later on, experiment with the cultivation of other products."

TAMIL COOLIES.—During the last year, some $15,000 have been expended by the Selangor Government in bringing Tamil labourers into that State. The Chairman stated that the Committee after discussion suggested, with the approval of the meeting, replying as follows:—"That this meeting thanks the Secretary to Resident General for the information, but cannot realise that the sum mentioned represents the total sum expended on the number of coolies recently brought into Selangor by that Government."

JAVA produces some 80,000 tons of teak timber per annum of which, however, only 10,000 tons are exported, chiefly in the shape of railway sleepers. At present the transport of long logs and squares is attended with difficulties which have not as yet been met; and though the annual possibility of the teak forests of Java is estimated at some 150,000 tons, no rivalry with Indian and Siam teak need be apprehended for some time at least.

FOWL MANURE.—A poultryman, who is noted for success in producing vegetables, states that he grows twice as much on an acre as formerly. He keeps 100 fowls, and has two lots of ground, one being given up to the fowls while the other is used for a garden. the lots being about 1¼ acres each. The next year he turns fowls on the garden plot, and uses for a garden the plot that was vacated by the fowls. By thus giving up his garden plot to poultry every alternate year, he keeps the soil very fertile.—*Texas Stockman and Farmer.*

THE FUTURE OF TEA AND COFFEE :

THE CRY FOR IMPERIAL FISCAL FEDERATION—"PROTECTION."

The circular letter from the United Planters' Association of Southern India given in our Correspondence, appears at an inopportune moment; for the news has only just been published that the "sugar bounties" of the Continent—the most notorious and obnoxious form of differential treatment—are about to be abolished and it is not likely, with that fact in view, that the British Government would enter on a policy so opposed to the principles of political economy which are now-a-days accepted by nearly all schools of statesmen. Not only so, but the Chancellor of the Exchequer, in a recent speech in Lancashire, specially denounced the suggestions he had seen made in certain quarters, respecting differential duties; and it is, therefore, in our opinion, a mere waste of time to try to move the Government of which Sir Michael Hicks Beach is so prominent a member, to listen to the prayer of the circular before us. A united memorial on the part of all British tea producers against the "sixpenny duty" on tea is far more desirable and likely to bear fruit, though, we fear, not in the approaching budget. How then is "tea" to get relief from the accumulation of stocks and consequent low prices now threatening if not prevailing? The first lesson surely to all producers both here and in India is to strive to the uttermost to pluck and manufacture better teas—no longer to sacrifice quality to quantity; but to pluck finer and aim at a higher standard of outturn. Native growers and makers of tea are not likely to take such a hint and we must, of course, recognise the fact that a certain quantity of cheap common tea is bound to be manufactured both here and in India; but we think there is encouragement to anticipate a new outlet for much of these cheaper teas in the movement now actively commenced by the Indian Association, Calcutta, to spread a taste and demand for tea among millions of the native community who can well afford to buy and use such teas. There can be no good reason why the vast population of India, Burma, the Straits and Ceylon should not follow, to some extent, the example set them in China and Japan in regard to the drinking of tea, morning, noon and night, albeit in the form of a very weak infusion. The custom cannot, of course, be expected to prevail generally for a good many years to come; but we hope to see each year make a difference in the local consumption of cheap teas. In this connection we draw attention to the article from a Calcutta paper on another page entitled "the slump in tea."

At the same time the manufacture of "green teas" must go on, and the fight to win over fresh consumers for our teas on the Continent of Europe and America be strenuously maintained. There is still another means of affording possible relief to the local market, of making Colombo more than ever the great tea port of the East, and certainly of increasing the trade and business of this port. That is to be found in the abolition of the local import duty on tea. We are convinced that the sooner this is done, the better for our tea interests all round. For one thing, it must at once meet the convenience of our Russian friends and encourage them more and more to concentrate their business at this port. If it further induced a local manufacture of "brick tea," there would be a distinct gain through the proportion used of our cheaper teas; while as to "blending," as it is notorious that Ceylon teas are blended at every port to which they are exported, we cannot for the life of us, see why the blending should not be carried out in Colombo, rather than, or just as much as, in Melbourne, Sydney, New York or London. As for the risk of China, Japanese or Java teas being re-shipped from Colombo as "pure Ceylon," we have frequently pointed out that some of our Ceylon tea shipments have already done us as much discredit as any lots from other countries under our name, could possibly effect, but as a matter of fact, experts in the different ports and countries could not be deceived by any "pure ceylon" label, while fraudulent attempts of the kind might be penalised at the same time that the import duty was abolished.

BRITISH NEW GUINEA.

INTERVIEW WITH MR. C. E. KENNEDY, MANAGER OF NEW GUINEA DEVELOPMENT SYNDICATE.

THE COUNTESS OF HOPETOUN'S BROTHER—A COLONIST OF THE NEW COUNTRY.

We had an interesting conversation last month with Mr. C. E. Kennedy of New Guinea, who was on his way home and had spent nearly a month visiting Ceylon, up-country for the most part. Mr. Kennedy is a colonist of ten years' standing in the comparatively new tropical colony, part of which is the same latitude south of the equator as Ceylon is north of it, and part of which reaches even to the equator itself. When Mr. Kennedy first went to New Guinea (as a lay worker for the C. M. S.) he was warned that it was a dangerous fever-stricken country and that he would never come back. After ten years' residence, Mr. Kennedy is now taking his well-earned furlough, determined, like others who know New Guinea, to remove the impression, wherever possible, that the conditions of life in his adopted home are anything but unfavourable to white men who are careful and temperate.

LABOUR

which we believed was one difficulty, is really very plentiful and obtainable for the equivalent of 1d a day! Amongst the independent Colonists, however, there is a feeling that Government is spoiling the labour market by offering too high wages—in some cases as much as 3d per day. This is no doubt so as to secure permanent workers, in a place where living is so cheap for natives that they are not likely to work except when inclined. Skilled labour moreover is very difficult to get, but there are enough hands for the mining schemes on foot;

no less than four companies for Gold Mining in New Guinea have already been floated. The country, Mr. Kennedy tells us, will grow anything that Ceylon will grow, from coconuts to tea. He himself has been growing coconuts (100 acres planted—1,100 acres reserve) with considerable success, and cacao also is making a start. Asked as to

TEA

Mr. Kennedy thought it was unlikely that tea would ever be grown in New Guinea ; it was already overproduced in Ceylon and India—not to mention Java or any other place. The Far East New Guinea Colony facing the Pacific, Mr. Kennedy is quite sure, will one day become one of the most prosperous, as it is one of the most fertile and extensive, under the British Crown ; it only requires that prospectors should get over their prejudice, visit the place and introduce more capital, for it to progress very rapidly. An instance of this shyness was found in the case of Messrs. Lever Bros., of "Sunlight" fame, who were urged by Mr. Le Hunte, the present Governor (successor to Sir Wm. Macgregor) to take up a tract of 5,000 acres for coconuts, to supply the oil needed in their soap manufacure. Mr. Kennedy himself was ready to take the charge, and, indeed, had been asked to inspect the land—the 5,000 acres were offered without limitation as to locality—but after considerable consideration the offer was allowed to slide! Land may be had for 2s 6d an acre and only the diffusion of greater knowledge as to the resources and climate of the country is required before settlers will come in their numbers to add civilisation and wealth to a new portion of the ever-growing Empire of Great Britain.—Coffee had been tried with success: -both Arabian on hill sides at considerable elevation and Liberian in the lowcountry grow well; but the plantations ,Mr. Kennedy said, had been neglected. They are now likely to be taken in hand by a Sydney Mercantile house bent on developing a planting industry. A ready market for "coffee" is available, and, indeed, Australia will take off a considerable supply of coconuts, coffee, cacao, &c.

THE HOPETOUN INTEREST IN NEW GUINEA.

From Mr. Kennedy, we further learnt an interesting bit of information. It appears that the Countess of Hopetoun's brother, the Hon. Edward Dayrolles Evelcigh deMoleyns, 4th son of Baron Ventry. has taken a liking to the country and intends to settle there. He has for some years been working in Queensland ; but hearing of the further Colony, chartered a yacht last year and took a nine months' tour cruising round the coasts of New Guinea, and landing at various points, made several trips inland to explore the territory. He has now taken up 2,000 acres in the Kearns district which, with his brother (the Hon. Richard Andrew (?) 3rd son of Lord Ventry), he intends to cultivate. It is satisfactory that a scion of a family which now has an increased connection with Australia should thus be settled in New Guinea—not only on account of the force of attraction that such a circumstance contains for new and hesitating colonists ; but also because it may prove useful in arranging for the amelioration of the laws and regulations prevailing which are as yet to some extent subject to the approval of the Governor-General on the mainland, as they have hitherto been to that of the Governor of Queensland.

VARIOUS NOTES.

It was interesting, and amusing to us, to see how much Mr. Kennedy knew about planting operations in Ceylon in a variety of products, until we remembered that he had been a regular student of the pages of the *Tropical Agriculturist* as well as of several of our Planting Manuals. We began to tell him that one of the finest plots of coconuts in the island was opposite Mount Lavinia Hotel, and how it got planted, when he replied, "by Dr. Macvicar—I've read about it in your book and have already inspected the garden with interest."

Mr. Kennedy's description of the growth of his palms on the shores of New Guinea in three years, shows that good seed nuts, careful planting, rich soil and a suitable climate must all have been available We hope Mr. Kennedy will be able to visit Goluapokuna and some of Mr. Jardine's work on coconut plantations in the Kurunegala district.

Our visitor's "forbears," of course, hail from that part of Galloway where the people used to declare:—"We're a' Jardine's, Johnstone's and Kennedy's here;" but he —like his father before him—was born in Staffordshire, and never left it till he started for New Guinea.

CACAO IN CEYLON.

Our notice of the large cacao pods which we received the other day from Katugastota estate and sent round the Fort offices has attracted the notice of an authority on the subject, who says it is important from an economic point of view to have the number and weight of the seed, as the fruit wall might be very big without correspond ing size of seeds. Fortunately the seed wer still available:—44 from the one pod, and 36 from the other, the 80 seeds weighing as nearly as possible a quarter of a lb. As regards the characteristics of the pods, we think they were more typical of the Forastero than of the Criollo variety

"TRAVEL IMPRESSIONS IN CEYLON OF A JAVA PLANTER."—The interesting paper under this heading translated from the Dutch by Mr. D. Ferguson will be found on page 470. It is useful to see how a practical planter from another and foreign colony regards the country, soil, climate, land tenure, vegetation, labour, &c., in Ceylon. As might be expected Mr. Bley makes mistakes which will be obvious to Ceylon readers.—We also expect to give shortly the report by Mr. Treub of the Java Botanic Gardens on his visit to Peradeniya and the other Gardens. This has been translated for us by Mr. Barrister de Vos and Mr. D. Ferguson and will be found both instructive and interesting.

FARMER'S EVERY-DAY LIFE IN SCOTLAND.

No. 16.

(*By Cosmopolite.*)

In a former paper I expressed views anything but favourable to the value of

ARTIFICIAL MANURES IN FARMING

and as special attention was drawn to my opinion by the editor of the *Observer*, I may be permitted to supplement what I wrote then with a few remarks. Of course, I know that the vendors of artificial manures are about the best customers any news paper has, as they advertise wholesale, and so naturally editors are chary of putting anything into their papers likely to be prejudicial to their customers' trade. I am not, however, wishing the proprietors of the *Observer* to adopt my views, at the same time I must be permitted, in these papers to tell what I have proved conclusively in my farming operations. When I say that my artificial bill on my first few years' farming in Buchan amounted annually to over £200, and at the present time it amounts to nothing, it shows that I am at least, a believer in my own views; and when I add that my crops only averaged 4½ to 5 quarters per acre, during the years when I used artificials, and now when using cattle and sheep manure only, they average 6½ to 7½ quarters, I think I have good reason to compliment myself on the policy I have adopted. But although I am a non-believer in artificials, it does not follow that I take no interest in the investigations carried on at Rothamsted and other experimental farms, so that reading the exciting letters of Messrs. Talbot and Melville White, lately appearing in the *Observer*, has afforded me much pleasure. Of course, when a sufficient amount of cattle manure cannot be obtained, as so often happened in Ceylon, some sort of artificial has to be applied and I observe that sulphate of ammonia and nitrate of soda are specially selected by the gentlemen named; but it appears to me that they have not taken enough of trouble to learn what is the best time to apply these manures, but have done so in a somewhat haphazard style. With regard to nitrate of soda, for instance, it is readily absorbed and passes into the plant; so, in farming, it is always applied after the corn blades are well developed. If I was a tea planter and was applying nitrate of soda to my bushes, I would wait until the flush of leaf had got a good start before doing so. Sulphate of ammonia on the other hand is not available until the ammonia absorbs oxygen and therefore does not come into action so quickly; consequently it should be applied to the land sometime before the plant is ready to absorb it. It may interest my readers to be told that nitrate of soda applied to hay increases the bulk of crop very much, but makes it so rank and disagreeable to the taste that animals will refuse to eat it unless compelled by hunger to do so. Would not the same effe be likely to occur in the case of tea leaves and if so what would the tea-taster say about the flavour? I gather from Messrs. Talbot's and Melville White's letters that the ject they have in view is not only the increase of crop, but the upkeep or restoration of fertility to the soil. I may mention therefore that so exhausting to the soil is nitrate of soda, that many landlords prohibit its use altogether, and I don't blame them, for I know that sometime ago it became quite a custom with farmers whose leases were drawing to a close to manure with nitrate of soda for the last two or three years, and this took all the fertility out of the soil and left the incoming tenant some years of heavy expenditure in order to get the place into a productive state again.

PAPER MAKING LECTURE.

THE POSSIBILITIES OF BAMBOO.

Mr. Ainsley Walker, in his lecture on paper-making delivered at Croxley Mill, Hertfordshire, recently, dealt with raw fibres, and the sources from which they were obtained, and described the machinery employed to cleanse esparto grass and straw from dust and other impurities. Speaking of straw, he pointed out its curious property of producing a greasy effect after having been put through the beater. This enabled them to produce a sheet which had more rattle, or to use the paper-makers' phrase "tinny effect," than could be secured from grass. Straw gave a very hard fibre, and as it consisted of parenchyma cells, which, however, served as filling the proportion of bass fibres was small, and a sheet of less strength was obtainable than from grass was the result. Bamboo was introduced in 1870 by Mr. Routledge who was also the means of bringing esparto grass to the notice of paper-makers. So enthusiastic was Mr. Routledge over bamboo that he published a pamphlet on the subject, printed from bamboo fibre, and excellent paper it was too. Mr. Routledge predicted that in years to come bamboo would be the most prominent fibre used in industry. So far that prediction had not been fulfilled, because wood had in the meantime played such an important part in paper-making. Bamboo had been described as a gigantic straw, with which its physical and chemical properties were closely allied. It therefore happened when they examined a sheet of paper under the microscope, that they found it no easy matter to differentiate the two classes of fibre for both had in considerable quantities the char,acteristic parenchyma cells and the cuticular cells. To this day the problem of readily and satisfactorily resolving bamboo into fibre remained unsolved. The difficulty he believed, was in knowing just how to boil it. He had experimented himself and though he had obtained fairly good results, he had not really succeeded. The subject thus presented a great opportunity to those students who desire to obtain honours for original research. Mr. Routledge stated that

THE BAMBOO YIELDED AS MUCH AS 40 TONS

of green stem per acre, and that these when dry were equal to six tons. The bamboo also grew at an almost incredible rate. It was said that it would grow to a height of 40 feet in 40 days, which was actually one foot a day. Here were possibilities for paper-makers in these days of keen competition. Paper-makers had been told that they had a sad state of things to look forward to in the future, but, if suitable means could be found for its treatment, they had bamboo to fall back upon. Therefore if the worst came to the worst, they could go to the wilds of India and establish the industry where the raw material would grow at their doors. The stems of the bamboo were cut before the plants arrived maturity, and that was all the treatment that was necessary before boiling. This brought them to those great sources of fibre—mechanical and chemical wood. Mechanical wood was obtained mostly from white pine, the poplar, and the aspen. These woods produced a fine, bright and white effect. They were cut into lengths equivalent to the width of the

stone against which they were to be pressed by hydraulic pressure. The rough sand stone tore the fibres asunder, and a stream of water, flowing over the stone, carried the fibres into a trough, from which they were passed forward to a series of cylinders, arranged with sieves of meshes of progressive sizes, by which the fibres were sorted according to their coarseness or fineness. At different stages the pulp was run into large vats with revolving cylinders, the idea of which, he believed, was taken from a machine invented by Mr. Dickinson. The pulp adhered to the revolving cylinder, and when a sufficient thickness was wound round it it was taken off. This then was known as mechanical wood. Chemical wood was obtained by the use of certain liquors and boiling. Great care had to be taken that no knots were allowed to go through. Some authorities said they should be drilled out, while others said that all the hard knots should be removed from the soft pulp after it had been run from the boilers. He was a believer in this plan. All, however, were agreed that any rotten wood or stained portions should be removed before boiling. The wood in some mills was carried on an endless revolving belt along which boys and girls were stationed in order to pick out the undesirable parts. Then the wood was crushed. The adherents of another process objected to this. They sawed the wood into inch discs, which were carefully packed in the boiler with a view to getting in the greatest amount of wood, and they also claimed to get by this plan a finer circulation. The great objection to this method was the loss by sawdust, which some declared amounted to 10 per cent., a serious item. In this country the pine and the fir were the sources from which mechanical wood was supplied, but in America it was obtained from 25 different varieties, the chief of which were spruce and poplar. As showing the great interest taken in the supply of wood for pulp, he mentioned that about 50 years ago, Mr. Young suggested the use of poplar in this country, saying that it was the coming wood fibre. He even went to the length of planting poplars for miles upon miles on the banks of the Dee in Scotland, but the climate and the soil were not suitable, and much to everybody's regret, the trees died off. Mr. Walker afterwards instructed a number of students in the use of the microscope.—*Home paper.*

ELEPHANT BREEDING IN MALAYA.

Through the kindness of Sir Frank Swettenham the Resident-General of the Malaya States, a a correspondent of *The Asian* has been given some interesting items of information concerning the breeding of elephants in captivity. It may be remembered that over two years ago we discussed the "Domestic affairs of the elephant" and the information now placed at our disposal considerably amplifies the facts set out under that heading. The breeding of elephants is a question of little practical importance; so high an authority as the late Mr. Sanderson stated that even if elephants did breed in captivity, it would not pay to begin stud operations as the youngsters are of no use for working purposes until 15 years of age; and this being so it was cheaper and more satisfactory to catch and tame. From the naturalist's point of view the matter is full of interest, and it would appear that the sources of information Sir Frank Swettenham has made accessible to us, will provide answers to many debated questions. From the fund of information presently furnished we select a few of the more important items. The Sultan of Perak, whose mahouts have supplied answers to the questions put for our correspondent states that the pairing of tame elephants as a rule results in the birth of a calf. "The birth of calves can be regarded as a matter of certainty." This disposes of any idea that the production of calves in Malaya is only occasional or accidental. The young ones are taken in hand to be broken when about four years old, and are apparently used for light work at a much earlier age than the limit named by Sanderson. But there is probably a wide margin of difference between "work" as understood by the late Superintendent of Kheddas, and as understood by the not very energetic Malay. We had, we confess, gained the impression that the domestication of the elephant in Malaya was complete, but our illusions are dispelled by the information now before us. The question was asked "whether a bull born in captivity has been successfully put to a cow born in captivity?" And the answer disposes of the "complete domestication" theory in very few words:—A bull born in captivity has never been successfully put to a cow born in captivity. The fact is curious, and opens up a large new field of enquiry. No enquiry was made as to whether a cow born in captivity had been known to throw a calf to a wild bull; but there is little reason to doubt that the cow, which has never known freedom, proves equally fertile with others when served by wild males in the jungle. The query "Can you say whether a bull born in captivity has been successfully put to a cow caught and tamed?" was, unfortunately, left unanswered. The point is an important one, involving, as it does, the question of respective effects of captivity on the reproductive power of male and female. The opinion that tame tuskers do not more commonly exhibit desire because hard-worked, is, we believe, pretty generally accepted; two answers to leading questions are answered by the Sultan's mahouts in terms which strongly confirm this belief. "The bulls which cover most freely are those which are in the best bodily condition and which do not perform hard work;" and again "the bull which has been longer in captivity, has the stronger sexual inclination." In regard to the latter, it must be born in mind that the work performed by tame elephants in Malaya is extremely light compared with that demanded of elephants in military or civil employ in Burma and in this country. None we are informed, work all the year round, and most are worked for only a few months out of the twelve. Further, the Malay owner, when his elephant shows signs of failing condition, turns him out in the jungles for a considerable period to regain flesh.

Sanderson's dicta concerning elephants in connection with breeding have been proved erroneous in some respects, and the Malay authorities confirm the more modern views. Sanderson, it will be remembered, favoured the theory that the period of gestation varied according to the sex of the calf. The Malay witness is not altogether satisfactory in his answers to questions concerning the length of the period of gestation, but as regards the length of period in connection with the sex of calf, he is quite definite—"It is the same whether a bull or cow-calf is produced." Of this matter, however, we shall speak again. In considering the points in which Sanderson's informants differ from our Malay informants, the difference in the conditions of the life led by tame elephants in this country and those surrounding the tame elephant in Malaya must be borne in mind; the latter far more nearly approximate to the conditions of jungle life and therefore we may conclude that natural habit and tendency is less disturbed. Therefore while Sanderson's informants may have been perfectly

correct in many of the statements which are at variance with those made over the Sultan of Perak's signature, the seeming contradiction may probably be explained by the widely differing conditions prevailing in each country. Thus, Sanderson stated that *musth* is not of regular occurrence in the tame bull, which statement, everybody knows, is perfectly correct; the Malay authority says: "With bulls in sound and full condition which are over twenty-five years in age, the periods of *musth* recur every year when the 'sependurian' is ripe in the jungle." He does not mention the season at which the fruit referred to does ripen, but he makes it perfectly clear that the bull elephant goes *musth* at a recognised season in each year. This does not controvert Sanderson. On the contrary there is a negative confirmation of it in his remarks that *musth* rarely appears in animals much below par. Difference in conditions of life cannot explain so radical a physiological difference as the following—Sanderson says: "There is ample proof that it is not the male elephant that comes in season. In following single males with a view to capturing them with trained females, they may always be relied upon to make advances to the females usually to some particular one." This is not very convincing evidence though it bears the stamp of observation for which Sanderson has deserved reputation. The Sultan of Perak's men say that bulls *do* show signs of *musth* in the presence of a cow in season, and that the cows have no regular season, "but merely follow the conduct or inclination of the bulls." Sanderson, if we read him correctly, did not admit any *correlation* between *musth* and sexual excitement, adducing in proof that on four occasions on which he had opportunity of judging the bulls showed no sign of *musth*. We think, however, that Sanderson's judgment on this point is now generally admitted to have erred.

It is curious that the answer to our correspondent's enquiry concerning the length of the period of gestation should be qualified. "Those who are experienced with regard to the habits of elephants put the period of gestation at twenty-four months." Inasmuch as opportunities of ascertaining the correct period are as frequent as those offered by other domestic animals it is somewhat strange that no Malay expert has taken the trouble to observe this point. There is no doubt that the period varies considerably in length, the recorded cases range from 19 months to 20¼ months, and in contradiction to Sanderson's native informants the calf born after the longest period was a female. There is evidently something to be learned from the Malay experts, as, in reply to the question whether the presence of man deterred bulls from leaping, the answer contains the statement "Others (elephants) again can be deterred by those men who have learnt the art of the elephant doctors of old times." We have "elephant doctors" on this side the bay, but their practice of necessity lies in a groove different from that of the Malay who for centuries has had dealings with "breeding stock" if we may apply the term to animals whose state of domestication is so incomplete that the union of two born in captivity is infertile. It does not appear that enquiry was made concerning the maximum age attained by the elephant, or if made no answer was given. The point is one which has been much, and sometimes fiercely debated, but facts worth recording are practically non-existent. From the circumstance that the bull elephant, according to our Malay informants, reaches maturity at the age of twenty-five, we might speculate from this basis on the limit of age attained, but see no particular end to be accomplished by so doing. There is no good reason for indulging in conjecture now as our correspondent informs us he is preparing a fresh series of questions for submission to the Sultan of Perak and hopes thereby to obtain light on this and several other points.

AN ORCHID FROM CEYLON.

PRESENTED TO THE R B S., LONDON.

A meeting of the Fellows of this Society was held yesterday, Mr. Andrew Clark in the chair. Mrs. Scharlieb, M.D., was elected a Fellow, and the names of ten candidates were read. There were shown specimens in flower of the lily of the valley orchid from Ceylon, presented by Miss Drage, and a flower of the Victoria Regia water lily now in bloom in the Gardens.—*Daily News*, Nov. 16.

RUBBER FROM TOBAGO.

An item which is likely to be of great importance in the future exports of Tobago is rubber. The only rubber which has hitherto been exported is the gum of the indigenous balata tree. This has been done on a very small scale, and could not be extended without rapidly exterminating the finest timber tree in the colony. Many cocoa planters, however, are now experimentally planting on selected parts of their estates the more profitable sorts of rubber trees, and two large estates are now devoted almost entirely to Castilloa. On one of these, in Tobago, seventy thousand trees have been planted but, of course, some years must elapse before the produce is put on the market.—*Chemist and Druggist*, Nov. 24.

ARTIFICIAL INDIGO had long been known as a laboratory product, costing far too much to be made upon a commercial scale. No one in this country thought of improving the process or inventing a new one, everybody being well content to be practical and to make the things he was accustomed to make. A large staff of trained chemists, maintained for purposes of practical research by the Badische Anilin and Soda Fabrik, turned their energies to this problem. It was, no doubt, a costly investigation, but not an unremunerative one, since many good things were discovered by the way. At last the triumph of theory was reached in the perfecting of a process, which practical ability, combined with vast knowledge and enterprise, has made a great commercial success. The output is now equal to the indigo crop of a quarter of a million acres in Behar; and, as will be seen by another communication which we print today, the planters are now appealing to the Indian Government for aid in setting up a supplementary sugar industry as the only chance of competing with the German factory. It would be easy to give other illustrations of the truth Professor Perry wants to drive home—that our education is not sufficient to enable us to hold our own, that our adhesion to antiquated methods is forfeiting our industrial advantages, and that it behoves the whole community, through all its enterprises, whether private or Government, to awake to the necessity for a more strenuous pursuit of that organization and co-ordination of knowledge which is called science.—London *Times*, Nov. 9.

TEA MANUFACTURE: SUITED TO REQUIREMENTS.

In discussing this question, the *I. P. Gazette* has the following:—We have been manufacturing, in bulk, a class of teas which cannot possibly compete in price with Chinas and Ceylons, Dealers at Home can get common and medium low class teas, just as good as ours, from China and Ceylon at a figure considerably below ours. Therefore, for that very simple reason, they are not wanted. A drug on the market, they are only saleable at a sacrifice; at a figure in fact which cannot possibly cover cost. The worst feature about the market is that even our better quality medium teas are now selling at prices which, in former years, were realised by our commons; the whole-sale dealers and blenders are now using these in their 1s canisters. The tea-drinking public are thus getting better value for their money; and, acquiring a taste for our higher class teas, will always demand the same quality for their shilling. Thus, whilst the price of teas is going down to the detriment of the producer, the wholesale dealer and blender and consumer are more and more getting their money's worth, in that they are obtaining for the same money superior teas to the common qualities with which they were satisfied in years gone by. We do not appear to comprehend this very apparent fact, that our common low grade teas are altogether going out of fashion. At present there is not a sufficient supply of the good liquoring quality teas to meet the demand, wholesale dealers and blenders have, therefore, perforce to take the less desirable kinds, but at their own prices: whilst they get better value for their money than they have hitherto got, the producer suffers heavily in that his product goes for a mere song. The chief cause then for the present slump in prices is undoubtedly over-production of common and poor medium kinds. This is due in a measure to coarser plucking this season, for a large proportion of the current season's crop has been of very indifferent quality; attributable partly to climatic causes and partly to a coarser system of plucking. There was, unfortunately an altogether abnormal market last year for common teas, and although a note of warning was sounded by all the Brokers in this city it was unheeded, and orders were issued that quantity, and not quality, was to rule the roost. The inevitable result has been that we have just played into the hands of the wholesale buyers at home. The next cause for the slump in prices of most importance, we think, we may safely assert is the shipping of teas to the home market direct, instead of selling in Calcutta. It has now become an unmistakably patent fact that if the Indian tea industry is to survive, and animation is to take the place of depression, Calcutta must take the place of London as the chief mart for the sale and distribution of our teas. Mincing Lane has not the diversity of buyers which our local Market has.

PLANTING NOTES.

GOURAMI FISH IN CEYLON.—We are much obliged to Mr. Fowler, Government Agent, Southern Province, for the information which he gives us in a letter we publish elsewhere. It is extremely satisfactory to note that Mr. Fowler's last attempt was so far successful, that two of the fish are flourishing at Galle, and that he is interesting himself in further introductions. We trust his example will be followed by some enterprising pisciculturist in Colombo or its neighbourhood.

CASSAVA OR MANIOC.—We direct special attention to the letter of the Curator of the Botanic Gardens on this subject and we trust that intelligent cultivators in different districts will at once comply with Mr. Macmillan's request, by forwarding to him specimens of the leaves and roots (flowers and fruit if possible) of the Cassava grown in the neighbourhood.—Mr. Jardine and Mr. W H Wright ought to be able to help the Gardens in this matter.

THE KANAN DEVAN DISTRICT.—We quote elsewhere a stout defence by Baron von Rosenberg, of the Kanan Devan District in South India, against an article which recently appeared in the *Investors' Review* which he thought was calculated to harm the prospects of the district generally, both as regards its credit and its position towards the Madras and Travancore Governments. His opinion is that before many years Kanan Devan will be one of the most flourishing among Indian planting districts.

PROSPERITY FROM COTTON-GROWING?—The last product we should think likely to afford a promise of profit to planters is "cotton." The price has fallen so greatly in India that we doubt if any European could make the cultivation pay. No doubt where there is rich soil, a favourable climate, and above all a local demand, the cultivation of one or other of the superior kinds might prove profitable. But Sir W. W. Mitchell did a great deal by introducing new seed into Ceylon, without being successful in getting native and other experimentalists to make much out of cotton. Here, however, is a paragraph from the *Egyptian Gazette* (Nov. 14th) which indicates that the American cotton plant is to be tried in German West Africa and is expected to do well:—

AMERICAN COTTON PLANT IN WEST AFRICA.—If the Germans do not attain to success as colonisers it will not be the fault of the "Colonial Economic Committee" in Berlin. By the help of generous expenditure they are now enabling Germans in West Africa to make a most interesting experiment. They have made an agreement with some American planters, to be accompanied by a hundred and fifty workmen, to introduce the American cotton plant into West Africa. It is anticipated that the plant will flourish well, and in that case the commercial prosperity of the district should be assured.

No doubt soil is rich and climate favourable in West Africa; and if labour prove abundant and cheap, the comparative proximity to the Liverpool market ought to tell. But abundant production will render competition keener than ever.

"PLANTING IN MEXICO"—is the heading of a very full letter by an ex-Ceylon Planter given in our daily and *T.A.* It contains a greater amount of practical information than has hitherto reached us, more especially as regards "labour supply"; and it will be seen that the report given is not very favourable. On the whole, for the British capitalist and planter, the advice of our correspondent is to follow the flag, either in British Honduras or the Malay States. But "Planter" affords a great deal of miscellaneous information regarding Mexico and its sub-tropical industries.

SNIPE.—An interesting letter to the *Asian* regarding snipe-shooting in breaks, is quoted on another page. The idea of such rapid and increasing destruction may jar upon non-sportsmen; but the capture of live snipe apparently leads to far more pain to the birds Live snipe, tortured by being tied together by the legs in bundles, are being exhibited for sale in the Calcutta Municipal Market, says the *Asian*. Taken up and swung about in the faces of customers and thrown down dozens of times a day, starved and maimed, the spectacle of the sufferings of these little creatures is a disgrace to those who have the power to put a stop to it.

JAVA CINCHONA SEED.—In connection with an advertisement of Java seed, we had the following note a short time ago:—

We used to consider bark analysing up to five or seven per cent as valuable; but the advertisement from Java which we publish in our daily indicates trees with bark up to 17 per cent! The seed from such trees, if carefully plucked and transported, must be very valuable. The prices fixed are from two to five guilders (each about 2s in value, we believe,) per gram, of which about 200 go to the ounce. The seed is, therefore, priced very high, undoubtedly; but we suppose an appreciable quantity is found even in each gram, or the 200th part of an ounce. Can there be any mistake in our calculation?

This was translated and copied into the Amsterdam "Indische Mercuur" of 25th September and has led Mr. H. Vaupel of the "Preanger Culture Company," Java, to send us (November 4th) a letter of correction in Dutch, the substance of which (through the kindness of Mr. Advocate de Vos of Galle) we are able to give as follows:—

"Now, without discussing how the advertisement in your various issues, works out, I take it that you, in Ceylon, are not up to the mark as to the number of plants to be got from a gram of cinchona seed. For this reason I to convince, you, send you a gram Ledgerseed, derived from original mother-trees with a standard of 17 per cent z.w.k. and of which the price is 5 florins. The number of seeds in this gram is 3,700. In Java, it is expected that by careful cultivation of this amount of seed the yield should be 1,200 at 1,000 cinchona plants for the 5 florins, making at most half cent the plant-which surely cannot be called dear."

We are much obliged for the correction and also for the gram of this very valuable Ledger seed, to which a careful trial will be given in a Nuwara Eliya nursery; while the resulting plants can be tried at different elevations as the Sanatarium is perhaps too high for pure Ledgerianas.

PEPPER AND CARDAMOMS.—These two products are doing well in Southern India though the former does not realise in England anything like the prices that are paid for Singapore pepper. Why?—*Planting Opinion*, Dec. 8.

PARA IN BRAZIL.—The output of Para rubber this season may possibly be augmented (says the *India Rubber World* of Nov. 1.) by the fact that the drought in the state of Ceara has become so excessive that the governments of the Amazon States have been defraying the expenses of the famine-stricken Cearense peasants to Para and Manaos, whence they would be likely to proceed to the rubber fields to find employment. During the first six months of this year the rainfall at the port of Ceara had been less than one-tenth as much as during the same period in 1899. For the same reason, a falling off in the production of Ceara rubber is to be expected.

PRODUCTION OF IPECACUANHA.—One of the most widely used of all vegetable drugs is the powerful emetic ipecacuanha, which is obtained from a Brazilian shrub. The French *Conseiller de Commerce*, at Cuyaba, in the State of Matto Groso, gives in a recent report an interesting account of this plant, which has in that State and the neighbouring districts its only habitat. The drug is obtained from plants which attain a height of from 12 to 16 inches. The leaves are oval, dark green, and sharply ribbed, and the white flowers give place to an ovoid fruit containing black seeds. Besides the *Ipecacuanha Cophoelis*, or the "white ipecacuanha," as it is generally known, there are several other varieties which are somewhat different, but all are used for the same purpose, and are distinguished as brown, black and striated ipecacuanha. The drug is obtained from the root of the plant, where it occurs in quantities about the size of a quill, between the layers. The taste is acrid and bitter, and the odour is nauseating That found next to the bark is most active in its effects, having in the highest degree the emetic property, due to the active principle known as "emetine." The State of Matto Grosso which as before observed, is the habitat of the plant, is one of the richest in Brazil, among its many natural products being gold and diamonds, rubber, sarsaparilla, jalap, jaborandi, copaiba, various drugs and gums of several kinds. Ipecacuanha is found in the north and north-east of the San Luiz-de Carceres, formerly in the Vila Maria region, and its habitat covers an immense area comprised between a network of rivers in Brazil, Bolivia and Paraguay. The dense foliage of the forest of this region provides the dank and humid conditions which favour the growth of the shrub. The Brazilian product is known as Rio Ipecacuanha, and the product secured from different shrubs in other countries passes under the name of the port from which it is shipped. Attempts have been made to transplant the shrub and to cultivate it in British colonies in various parts of the world, but without success, and Brazil continues to be the only source of supply for the best grade. The process of gathering the plant is perfectly simple, and during the rainy season, when the ground is soft, is very easy. A stick is inserted under the root, and while this is raised with one hand, the entire plant is pulled out with the other. As little care is given to the protection of enough plants to secure a future supply, the output is growing smaller, and the price consequently higher each year. The scarcity of workmen is a great difficulty. In the dry season the roots cannot be gathered, and it is at this season when anyone adapted to the work is engaged in gathering rubber. During the rainy season, from October till April, when the plant may be easily drawn from the ground, women are usually employed for the work.—*Scientific American.*

GOLD IN TREES.—The impecunious man may soon be seen grappling with the monarchs of the forest for the wherewithal to pay his way. In the "Zeitschrift fur practische Geologie" Herr Lungwitz writes of the gold in trees. It only amounts to from about 5d to 5s per ton of ashes. The metal tends to collect in the trunk near the roots. Of course the quantity is greater according to the auriferous character of the soil, and probably, too, the intensity of growth, so that in tropical countries gold may exist in many plants.—*Daily Express.*

A BOTANICAL ACQUISITION.—Botanists will be interested to learn that the important cryptogamic herbarium of M. Bescherelle, a well-known French botanist, has just been acquired by purchase for the Department of Botany in the British Museum. This herbarium which is one of the most complete of its kind in the world, consists chiefly of mosses, lichens and liverworts, collected in great part in the French colonies, where M. Bescherelle has practically had a monopoly in this respect for the last 30 years. The *Manchester Guardian* (Nov. 23rd) understands that there are 15,000 specimens of mosses and nearly 4,000 specimens of liverworts in this fine collection.

LIMITED COMPANIES.—From "Notes on the Companies Act, 1900," by L Worthington Evans, we learn Directorships will certainly not be so popular in the future as they have been in the past, especially (let us hope) among incompetent nobles sometimes called Decoy Ducks. The Act contains restrictions of the power and additions to the liability of a director as well as "a formidable list of fines and penalties." The responsibility and duties of the secretary are also increased; and these additional requirements, as well as others in regard to registration, apply to all companies registered under the Companies Act. After the first day of January, 1901, no new company having share capital may proceed to allotment until the minimum subscription has been subscribed, and not less than 5 per cent. of the nominal amount of each share has been paid in and received by the company as application money. And both these conditions must be fulfilled within forty days after the first issue of the prospectus. In default of compliance with these and other conditions an applicant is entitled to receive back his application money in full; and unless it is repaid within forty-eight days after the first issue of the prospectus the directors become jointly and severally liable for the amount. For all companies registered after January 1, 1901, quite a number of new requirements are introduced, which, as Mr. Evans truly observes, will tend to make the statutory meetings of the company (ordinary and extraordinary) exceedingly important instead of the often useless formalities to which we are accustomed. The power of control possessed by the shareholders is vastly increased. At an early stage in the company's existence a shareholder will be able to test many of the statements in the prospectus and ascertain officially the facts about the allotment, as well as the names of his fellow shareholders with whom he can combine for protection. The book contains an interesting chapter upon the duties and responsibilities of the auditor, whose appointment has now at last been rendered compulsory, and is to be made not by the directors, but by the shareholders.

A NEW GOANESE INDUSTRY.—A contract has been entered into for the construction of an edifice for the Bombay and Goa Trading Company in the New City of Vasco de Gama. The firm consists of Mr. S J De Souza and of the representatives of the late Mr. Goculdass Tejpal the Bombay millionaire. The principal object of the firm is the erection of a coir and rope factory together with the utilisation of the other products of the coconut palm. The firm who are building the coir factory are in a position to operate in this commodity on a large scale. It is calculated that the company will require from 24 to 30 lakhs of coconut husks annually for fibre and coir yarn, and it could easily convert the coconut into copra and export the same or convert this last into oil and export it. It is in contemplation to order out the latest machinery for this purpose.—*Pioneer*, Dec. 3.

OSTRICH FARMING IN AMERICA.—We call attention to Mr. T. A. Cockburn's chatty notes in another column. From a circular he sends us, we quote as follows:—

The Ostrich Farming Industry has been begun in San Antonio, Texas, by Mr. Thomas A. Cockburn, for some time the proprietor of the famous South Pasadena Ostrich Farm, of Southern California, in the hope of establishing this peculiar industry as successfully in Texas as has been done in California. Fifty of these magnificent birds have been transported across the continent to their new home near San Pedro Springs, where there is every prospect of their settling down to regular Ostrich ways. Compared with the imported South Africa article, the local product is considered by connoisseurs much superior, and after a careful examination of the large and varied stock of boas, capes, collars, tips, plumes, fans, etc., at the San Antonio farm, this opinion will be upheld by the general public. The birds vary in age from a few weeks to eight and ten years of age. A full grown ostrich weighs about 275 pounds, and stands nearly eight feet high, both sexes are a brownish color until eighteen months old, when the males turn black and the hens grey. At four years old the selected birds are paired off, and soon the male bird digs a hole with his feet, in which the hen will lay an egg every other day, until from twelve to fifteen are in the nest, when they begin setting, the hen in the day and the cock in the night; in from forty to forty-two days the chicks should hatch out. In this country they are immediately taken away from the nest and raised by being fed on cut up green alfalfa. They will then grow at the rate of a foot a month until six mouth old. The average life of an ostrich is about seventy years. The food consists mostly of alfalfa hay, cut up small, sugar beets, cabbage and corn. Bones and shells are occasionally given to help digest their food and form the shell, coarse gravel is also kept in the corrals for the same purpose. The eggs weigh three pounds each, the unfertile ones are blown and obtain a ready sale as souvenirs of the ostrich farm. The feathers are plucked every nine months and are graded into their various lengths and colors. These sell in the markets at prices varying from $5.00 to $100 per pound, the latter from the long white plumes taken from the wings, only those feathers from the wings and tails are plucked, the body feathers are shed once a year and are gathered up in the corrals. Every feather has a selling price. Many and varied are the products of Texas, but the industry of Ostrich Farming is possibly the most interesting and peculiar to the general public, and no tourist should consider his trip complete until he has paid at least one visit to the San Antonio Ostrich Farm. There is no more pleasing or suitable souvenir to take back or send to some eastern friend than a feather boa or a bunch of tips manufactured from a Texas ostrich. Prices of birds of all ages on application to the proprietor. Feather goods of all descriptions for sale on the Farm, at producer's prices.

TO ALL PARTS OF ASIA, AFRICA, AMERICA AND OCEANIA.

Seeds & Plants of Commercial Products.

Hevea Brasiliensis.—Orders being booked for the coming crop August-September delivery 1901, booking necessary before the end of April, quantities of 100,000 and over at special low rates. Plants available all the year round, 100,000 and over at special low rates. A leading Rubber planter in Sumatra, who purchased 50,000 seeds in 1899, and 100,000 in 1900, writes us, under date 15th Novembe, 1900:—"I received your letter of 20th October, from which I learn that you added another case of 5,000 seeds to replace the loss, &c. I am satisfied hereby, and even after this adding I am satisfied by the whole delivery of this year."

Castilloa Elastica.—True superior variety cultivated in Mexico, seeds from specially reserved old untapped trees. Orders booked for August-September delivery 1901, booking necessary before the end of March; large quantities on special terms; Plants in Wardian cases.

Manihot Glaziovii—Seeds and Plants available all the year round, 100,000 and over at special low rates. A Mexican planter in sending an order for this seed wrote on the 22nd August, 1900:—"If they arrive fresh and germinate easily I may send you larger orders, as they are for high ground where the Castilloa does not thrive."

Kickxia Elastica.—(*Funtumia Elastica*).—Seeds and Plants, orders booked. (Lagos rubber.)

Ficus Elastica.—Seeds available in May-June; booking necessary before the end of March; also plants.

Urciola Esculenta and **U. Elastica.**—Same as above. (Burma rubber.)

Parameria Glandulifera.—Orders booked for seeds for January-February delivery; also plants, immediate booking necessary. (A good rubber creeper of Malacca.)

Landolphia Kirkii.—Seeds in July-August, early booking necessary. Plants can be supplied all the year round. (A highly recommended species.)

Chonemorpha Macrophylla.—Seeds and Plants; orders booked. (A very valuable rubber-yielding creeper.)

Memusops Globosa and **Payena Leerii.**—Seeds and plants in July-August, booking necessary before April.

Achras Sapota, Willughbeia Firma, W. Edulis and other **Rubber and Gutta Percha** yielding Trees and Creepers, Seeds and Plants.

Cinnamomum Zeylanicum (Cinnamon superior variety). New crop of seed in April to June; booking necessary before the end of February; also plants.

Coffee Arabica, Liberian Hybrid and **Maragogopie Hybrid.**—New crop March-April; immediate booking necessary.

Cinchona Ledgeriana.—Seeds now ready, also other varieties.

Seeds and Plants of Nutmeg, Clove, Sandlewood (white and red), Pepper, Cardamom, Vanilla, Cacao, Tea, Coca, Fibre, Medicinal and Fruit Trees, Shade and Timber Trees, Eucalyptus various varieties, also Palms, Bulbs, Orchids, &c.

Our enlarged Descriptive Price List of Tropical Seeds and Plants of Commercial Products for Foreign countries for 1901-1902, now being prepared, and will be ready in a few months.

"SOUTH AFRICA."—The great authority on South African affairs of 25th March, 1899, says:—"An interesting Catalogue reaches us from the East. It is issued by WILLIAM BROTHERS, Tropical Seed Merchants, of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great Powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbing. We recommend the great Powers and Concessionaries under them to go to William Brothers."

Price List of Seeds and Plants for CEYLON use post free on application.

Our new Descriptive Price Lists of Seeds of Shade Trees for Coffee, Cacao, Tea, Cardamoms, &c., Timber Trees, Trees for Avenues, Hedges, Wind and Shelter Belts, Ornamental Trees, Shrubs and Climbing Plants; and Seeds and Plants of Palms, Calamus, Pandanus Cycads, Tree and other Ferns, Crotons, Orchids, Bulbs, Dracinas, now being prepared and will be ready shortly.

Special Arrangements made with foreign Governments, Botanical and Agricultural Departments, Planters and others for supplying seeds and plants of Commercial Products in large quantities.

Agents in London:—MESSRS. P. W. WOOLLEY & Co., 90, Lower Thames Street.

Agent in Colombo, Ceylon:—E. B. CREASY, Esq.

Telegraphic Address:
WILLIAM, VEYANGODA, CEYLON.
Lieber's, A.I. and A.B.C. Codes used.

J. P. WILLIAM & BROTHERS,
Tropical Seed Merchants,
HENARATGODA, CEYLON.

Correspondence.

To the Editor.

PLANTING IN MEXICO.

(By an ex-Ceylon Planter.)

The Editor, *Tropical Agriculturist*, Ceylon.

Mexico, Sept. 9, 1900.

DEAR SIR,—In the *T. A.* for January (which went amissing and only reached me in August) and for July, I notice a couple of letters from Mr. E O Darley on "Planting in Mexico," also your note on the same, asking for information *re* labour, taxes, police etc. In the July number, Mr. Darley has given you some information, and I now take the liberty of supplementing the same. It must be remembered that Mr. Darley writes from the State of Tabasco, whereas I am in the State of Oaxaca, and therefore my remarks and statements mostly apply to this State, and to the district I am in. But at the same time there is little or no difference between the States as regards taxation, communication, etc. I have now been nearly 18 months in Mexico, and have had ample time and opportunity for going fully into every matter that affects planting and give my actual experience. I may preface my remarks by stating that I was planting in Ceylon from January 1877 to May 1880 in Udapussellawa and Maturata, and from May 1880 to December 1898 in Johore, the Federated Malay States, and West Coast of Borneo. I arrived here at the end of March, 1899.

SOIL AND LAY OF LAND.—Beyond any doubt the soil of Tropical Mexico is exceedingly rich and of vast extent, and, in what I may call the low country, is of a rolling character with large areas of almost level country, generally along the rivers, and between the spurs of the main ranges, these spurs generally being of limestone formation. Taken all round, however, the country is badly watered. For instance, in the whole of this Company's lands extending to 111,000 acres, there are three large streams, miscalled rivers, two of which form the North, East, South and South-Western boundaries, one running through the centre of the block. There are only ten other small streams running into these, and yet our land lies at the foot of the "Sierra Madre" mountain. Soil suitable for atmost any kind of tropical cultivation can be purchased for from $3 to $50 the acre, anywhere in the best part of Mexico. We sold for tobacco for the latter price here.

CLIMATE AND RAINFALL.—Once outside the range of yellow fever "vomito" which roughly is confined to a distance of about 60 miles inland from the sea, from Tampico to Coatzacoalcos, the climate for the Tropics is remarkably good and perfectly healthy. The rainy season begins about June and ends in September, but during October to end of December there is generally a fair amount of rain. From January to May the weather is fine with occasional showers. March, April and May are the hot months, November, December and January the cold; and even at this elevation, 615 feet, fires are often necessary at nights, and a couple of thick blankets. The rainfall has been systematically kept only since my arrival, but commencing from 1st July, and I append it:—

1899.	Inches.	Rainy days.	Heaviest fall inches.
July	21·30	19	3·40
August	25·48	17	4·30
September	17·31	11	6·00
October	5·05	5	2·00
November	3·52	2	2·72
December	3·55	5	1·58
1900.			
January	3·23	9	1·30
February	1·83	2	·92
March	2·04	5	·72
April	1·30	2	1·00
May	6·80	6	2·50
June	13·83	11	3·75
July	25·51	25	2·77
Aug.	18·94	12	3·15

On the 18th February, the thermometer registered in the office 55° Fahr. at 11·30 a.m., about the lowest it has been since my arrival.

COMMUNICATION all over Mexico is by means of railway, river and tracks. Metalled or unmetalled roads outside the cities (and few even there) do not exist. The rough jungle tracks, worn down by the feet of man and animals, that were in existence in, or perhaps before, Montezuma's time, are the only ones that are available, and as these go up hill and down dale, one can fancy what the travelling is like, especially in wet weather. As far as I am aware, the Government has not even commenced to think about road making. I will confine myself to the Railways serving the tropical portions where plantations are mostly being opened. First there is the line from Vera Cruz to Alvavado, some 40 miles. It now belongs to Sir Weetman Pearson, a bad line, badly managed. Ordinarily it takes four hours to do the journey. Another line runs from Coatzacoalcos to Salina Cruz, across the Isthmus of Tehuantepec, and a branch line from the main line to the San Juan river. Another line is now under construction from Mozorengo to Santa Lucrecia on the Tehuantepec railway. All these are either under the management of Sir Weetman Pearson or are being constructed by him. On paper, this seems to give ample communication, but one has only to look at the map to see what a small portion it serves, especially as there are no roads to serve as feeders. The lines, too, are chiefly strategical ones, as President Diaz does not intend to allow revolutions to grow unchecked. Now as to the rivers. Stern-wheel shallow-draft steamers run all the year round from Alvavado up the Papaloaparm river to Tuxtepec from Tlacotalpam (two hours steaming above Alvavado) up the Tesechoacan river to Tesechoacan, and during the wet season up to and a little above Playa Vicente. There is also regular steamer communication, all the year round up the San Juan river from Tlacotalpam, up the Coatzacoalcos, and some of the other rivers in the more Southern States, but how far the boats can go during wet and dry seasons I do not know. What I do believe is that these rivers only serve a small part of the lands suitable for cultivation, and here again there are no roads as feeders. In the section I am in, during the dry season, we have to depend on canoes for transport, and as the "canoeros" as a body are a drunken lot, we are at their mercy. It has often taken three months to get goods up from Tlacotalpam to where I am (just above Playa Vicente) during the dry season. Freight from Tlacotalpam to here, by canoes, is paid for by the piece of 200 lb. and costs $28 (twenty-eight) the ton up and $17

down if you have return cargo. By steamer it costs from $28 to $31 the ton both ways, the distance by river being about 120 miles. Freight from Tlacotalpam to Vera Cruz has to be added, but I have not the figures by me. There are besides handling and storage charges first at Playa Vicente (12½ct. a package) Tlacotalpam same, perhaps at Alvavado, and finally at Vera Cruz, and I am much better off than the vast majority in this section. The freight from Vera Cruz to London is about the same as from Singapore to London. The next "revolution" has got to come from the Government in the shape of roads, and by that time our grand-children will be old men and women. Private enterprise will, most likely, have to undertake road-making, and pay Government for doing so.

LABOUR.—All who have gone in for Tropical Agriculture in Mexico have, with a strange unanimity, avoided this most important question and for very obvious reasons. First, the large holders have lands for sale, and soon, if I am not mistaken, the small buyers will be sorry they ever bought. There are four classes of labourers employed in estates in Mexico:—1st labourers recruited from Oaxaca, Mexico and other cities and surrounding villages on a 3, 4, 6 or 180 days' contract; 2nd Serranos, 3rd, prisoners, 4th, villagers living in the vicinity of plantations. The 2nd and 4th class are by far the best labourers, but will not go far afield for work, and will only leave their villages for crop time (generally end of October to end of December). In fact unless the estate is in the hills or near their villages this class of labour can only be depended upon for crop, but will not stay and work steadily all the year round. The 3rd class are taken out of the prisons on payment of $5 to $10 a head, and this forms a more or less regular income to certain Government officials, not leaving out the highest in each State. This labour has to be worked literally as prisoners, and as regards treatment, wages, etc., the slave was far better off. They are generally the greatest scoundrels in a country that produces a good many. I have seen them brought up on a steamer, bound together and guarded by armed police. They are invariably locked up at nights and when not working. There is a good deal of this class of labour used on the tobacco plantations. They cost anything from $15 to $35 landed on the estate per head and work from three to 12 months getting 25ct. a day and food, but in the majority of cases get nothing when leaving, and if they do have a balance are given every opportunity to abscond. Personally I have never worked this class in any of the estates under my charge. The 1st class is the one generally employed. My experience is with Oaxaquenos chiefly. They are recruited on a "180 days' work" contract, the longest term they will agree to. This is illegal, as according to the Mexican constitution, no Mexican can contract his time. In practice the law is not enforced, but still it exists. The average advance comes to $16 for a man, and $9 for a woman, all recoverable. The recruiter gets a commission of $10 for a man and $5 for a woman which is not recoverable. Wages: men 37 cts., women 20 cts., boys and girls, 10 to 15 cts., a day, with food. My average rate of wages from June 1899 to end of August this year, works out on all the five estates under my charge to ·6518 cents per working labourer per diem. This includes wages, food, commission, cooks, watchmen, water-carriers, cabos (kanganies) wages and food and loss on absconders. Per contra the credit balances of absconders are also credited to the average. Working with class Nos. 2 and 4, the average would be perhaps 5 cents less, and in the Sierras perhaps 10 to 12 cents less. Nearer the coast the average would come to about 80 cts. As to the labourer himself, I will sum up his chief characteristics—laziness, stupidity, carelessness, drunkenness, callousness, self-conceit and an utter absence of ambition and thrift are the chief, lying and dishonesty coming a good 9th and 10th. When he first arrives, his chief idea is to abscond, but when treated fairly, he soon settles down. I am not judging him from a European standpoint, but in comparison with Tamils, Sinhalese, Chinese, Malays, Javanese, Banjarese and Dyaks, all of whom I have worked during my 21 years in the East. As regards work; in heavy weeding, he will do about 15 per cent more than a Tamil, but not as good work; and in clearing with the "machete," he is as good as the Malay with his "parang;" but in every other respect he is 10 to 50 per cent behind the Tamil as regards estate work. What can be expected from labour 10 per cent of which are field hands, and the balance loafers, gaol birds, tradesmen, artisans, clerks, etc. No wonder they have to be constantly watched, and often as not locked up when not working and at night. Beyond weeding and using the machete, they know nothing about estate work, and by the time you have taught them something of their work, their contract is up and away they go and you have to begin again. By taking advantage of his thriftlessness, I have kept a good many of the best men in the place for a year by advancing them goods from the estate shop, thus keeping them in debt and raising their wage to 50 cents a day. None, however, will stay beyond the end of crop *i. e.* 18 months from date of contract. When they get a craving for change nothing will keep them. Labour, such as it is, is scarce, and some Americans are beginning to introduce Chinese at a cost of $75 to $100 a head and $1 a day wages without food. In the first place they are making a mistake by getting them through the San Francisco "Societies" and unless Planters and Government combine and get Chinese direct from China, they will end by being at the mercy of the "Societies," as the Sumatran planters were; but under existing circumstances such a combination is very unlikely to come about. The present labour is bad, expensive, and insufficient and Chinese are the only ones that can be got. My experience of 18 years with them is that they work splendidly on contract, but on day wages are very unreliable and do as little work as they can.

TAXES.—Mr. Darley says: "Taxes are low enough." This being a country with a Protective Tariff disproves the above. The import duties are heavy, running in some cases to 75 per cent and 100 per cent. This fact makes living expensive, even plain living. But leaving out import duties, the following are the duties we pay in this state,

INCOME TAX on incomes over $15 a month 4·33 per cent per annum.

POLL TAX on labourers (recoverable) 21 cents a month, payable by estate.

TAX ON GROSS SALES ESTATE SHOP 1·90 per cent per annum.

LAND TAX $13 on every $1,000 value improved or unimproved land or other property.

PROPERTY TAX (readjusted every five years.)

CATTLE TAX, if over 10 are kept for breeding purposes. I do not know the tax.

STAMPS ON INVOICES OR BILLS. 3 cts. on every $5 (or part of $5) value of goods bought.

STAMPS ON CHEQUES 5 cts. Do on draft or bills $100 2 cts. $500 5 cts. beyond $500 1 ct. for every $100 or fraction.

STAMPS ON LEDGER $14 95, cash book $9 90, Journal 75 cts, all liable to Government Examination, a very good thing too.

LEGAL RATE OF INTEREST 6 per cent. The usual rate charged is 12 per cent.

EXPORT DUTIES on coffee remitted, cacao nil, Rubber nil, Tobacco nil, Vanilla nil, Sugar nil, and Aguardiente, none,

IMPORT DUTY has to be paid on all Tools, Machinery, Ploughs, Harness, Bags, (if good ones are wanted) etc, that are used on an estate. (See enclosed letter from Mex. Commercial Company).

POLICE.—I maintain that Mexico is not well policed. I except the capital, towns and large villages. The nearest village to me is some 25 miles off and has two policemen. Being in Vera Cruz state, they are useless to me. The capital of this district is about 60 miles off, and takes three days, over a fearful track, to reach. These are the nearest police that I can call upon. Since my arrival there have been four murders (two of which were by my own discharged men) that I have heard of, and one arrest, and this last due entirely to my action. As to minor offences, such as brutal and serious assaults, no notice is taken. Prisons are an absolute disgrace. Hanging is not allowed and imprisonment, no disgrace. The worst punishment is to send a man to the Army. A criminal or absconding labourer has only got to get into another state and is practically free from punishment and arrest. Certainly every estate can have its own police, but has to pay $20 a month per man, feed and house both himself and his horse.

GOVERNMENT.—As in the United States, there is no "covenanted" Civil Service in Mexico, but unlike the United States, though a mock form of voting is gone through. Practically all the Governors of the States, the Federal officials and the members of the Legislature are nominated and appointed by the President, and it is lucky for Mexico that President Diaz still remains at the head of affairs. I consider him the ablest man in America. Every State official is under the thumb of the Governor, and as their appointments only rests on favour, they with few exceptions do his bidding, and all hasten to make "hay while the sun shines." They are all badly paid. Each State is sub-divided into districts at the head of which is the Jéfé Politico and with him the Juez, or Judge, both responsible to the Governor. Each district again is divided into municipalities under an "Alcalde" and "Agente Municipal," who are responsible to the Jéfé and Juez. Until we got our own "Alcalde" and "Agente Municipal," whom, of course, we have to pay, we were under two Indians who could neither read nor write a word of Mexican. I will give two examples of the result. Two of my house servants in a drunken fit, broke into the dispensary and drank some carbolic acid that was in a used whiskey bottle. One died and was buried next day. I notified these officials and three days after they came down, and I was informed by the Secretary that I was liable to a heavy fine for burying him before the officials had seen the body. Backsheesh smoothed everything. Case No. 2. One of my men whilst bathing in the river was drowned, though his wife and several others saw what was happening and never said a word or tried to help. This is not singular, for they all have a dread of anything that has to do with their courts of justice. On Monday evening his body was found half a mile down the river and on Tuesday morning I notified the officials, leaving his body where it was found. Four days after they came down, only to examine a skeleton, as in the meantime the carrion eagle had done the work for which it is protected in this country. The machinery of the law is slow beyond all imagination, and justice, to quote Kipling, is "to him who holds the longer purse" as regards the state courts. I have had a simple case on a pro-note going on now for a year and we are just as we started, the Judge having taken one year to discover that the case was a "civil" and not a "commercial" one, and there is every appearance that this decision was given under instructions. The Supreme Court of the Republic is, I believe, beyond reproach. I quote the words of an influential and well educated Mexican merchant to me:—"In the matter of justice we are far behind in Mexico, and General Diaz seems to be more bent on material progress than upon moral advancement."

PRODUCTS.—Cultivation as understood in the East is quite unknown as yet in Mexico, unless amongst the few men of Eastern experience. From what I have seen, there is a want of even elementary knowledge of planting. Once the plant is planted (often as not "stuck in") three to four weedings or cutting down the weeds with a machete a year is all the cultivation that is given. The soil and climate do the rest. This want of knowledge is due in my opinion to the following causes:—1st. The want of "go" and education amongst the vast majority of Mexican planters. 2nd. The bad and costly labour. 3rd. The richness and productiveness of the soil. Whether in the face of costly transport and the labour conditions, cultivation will pay, remains to be proved. What I do know is that at the present moment there are very few solvent coffee and tobacco planters in Mexico, and a large number of estates of the former have been abandoned and of the latter put out of cultivation. Estimates coming from Mexican or American sources I entirely mistrust; first, because the Mexican as a rule only calculates the amount he spends on labour, and the American estimates come from men with land to sell. Crop estimates are more reliable, but even these should be discounted considerably. I have carefully worked out the cost of properly opening, cultivating and bringing into bearing the following products under existing circumstances in this section and append the same. If I have erred at all it is on the expenditure side, as of course, every planter has his own ideas of how a work should be done. I have taken the acreage of each estate as 500 opened.

COFFEE.—To bring into bearing, say 4th year $300 per acre. Returns in full bearing 8 cwts. the acre, Cost of cultivation $120 the acre. I have seen absolutely no disease.

TOBACCO.—The first year will cost $15 the arroba (25 lb. Spanish) value $18 the arroba. The 2nd year will cost $10 the arroba value $20 to $25 the arroba. Only under expert management. The yield here for the 1st crop is an average 2½ arrobas

per 1,000 plants. The following year $1\frac{1}{2}$ to 2 arrobas. This is far under the Sumatran yield.

RUBBER.—Planted 14' × 14' will cost to bring into bearing (*i.e.* full 8th year) and if regularly weeded $150 the acre.

Yield 8th year 1lb. per tree cost per acre including gathering $95.

Yield 9th year 2lb. per tree, cost per acre including gathering $150.

Yield 10th and following year 3 lb. per tree, cost per acre including gathering $200.

CACAO.—Will cost to bring into bearing $250 the acre. Yield in full bearing 8 cwts. the acre cost $100 per acre.

SUGAR AND AGUARDIENTE.—It is generally calculated that in this part the same field will go on yielding from 10 to 22 years (a pretty wide margin) and the profits range from $600 to $800 the "hectara" ($2\frac{1}{2}$ acres). In my opinion, as I know nothing of sugar, a good deal of salt would mix well here.

RICE DRY.—This is a crop that for years to come will pay, I believe, better than any other. Very little labour is required. There is a large local demand and prices are good. Rice costs us here 12 cents the pound.

VANILLA.—This is its home, but I can gather no information about it. It grows wild in the forests here, as does rubber. On the Tobacco lands, crops of Maize and Beans are raised, but I do not approve of this mode. There is a large local demand for CACAO, Mexico even importing it, hence the local high prices which Mr. Darley correctly quotes. There is also a good local demand for sugar, maize, beans, tobacco. The local demand for Aguardiente is enormous as the Mexican mozo or peon cannot do without his one, two or three "copitas" (glasses) a day, and they begin drinking as children and gulp it down almost raw without a wink. It is their one remedy for almost every ill. When, however, this local demand is met, and the planter has to compete in the open markets against countries with cheaper and better labour, cheaper transport and light taxes, how will he fare? Time alone will tell. In the meantime he has magnificent soil in his favour and a large and close market in the United States and Canada. It is true Americans are rushing in and taking up large tracts of lands. There are a few exceptions, but the majority are buying only for a deal. They will dispose of these lands in small blocks to would-be planters, and I prophesy that these will be "left." What Company can deal with 100,000 acres of land and over; certainly not open it themselves? In my immediate vicinity there are 588,000 acres of magnificent land for sale. The truth is there is still a large land boom on in Mexican tropical lands and, what goes hand in hand with land booms, a plethora of exaggerated estimates like the one you published on page 36 of the July *T. A.*

LIFE ON A PLANTATION.—As I have said previously, living, even of the plainest, is very expensive, unless one lives like a Mexican on dry beef, chickens, beans, rice and tortillas and coffee. If you offer a Mexican tea, he will decline saying that he is not ill. Such a thing as a good cook or house servant is not to be found in Mexico, taking the standard of upcountry in Ceylon or in the Malay Peninsula. A plain cook, generally Chinese, will demand $30 to $40 a month and food and a house servant of the same nationality $20 to $30 and food and get it too. Mexican cooks (women) get $12 to $15 and food and house servants $15 to $ 20 and food. The Mexican servant is the most hopeless, lazy, ignorant and dirty brute I have ever come across. He has no idea of waiting, or general house work, and the cook is of the same class. Their worst point is that they will not learn, they have too much self-conceit; and if you get one who is willing to learn, they will not stay long enough to be taught, and if they do, will only learn up to a certain point. I answered a cook's advertisement in the *Mexican Herald* and enclose his reply. $100 a month and food is not bad for a "Mussleman from Conpore" calling himself "Charles Sherman."

The other delights consist of insects called "rodadores" that torment and bite one all the day and all the year round, sandflies that do the same at night during the wet season, and mosquitoes (these only bad in some places). During the dry season one cannot walk through the grass without getting covered more or less with ticks and lice. Of sport of any kind there is none, nor recreation nor society. If one is surrounded only by Mexicans, all idea of civilized society and sociability has to be given up. To compensate for the life one would have to lead, would require larger profits than I am afraid any estate would yield.

For rubber and coconuts, Mexico and adjoining countries will have a formidable rival in the Malay States where labour is from 100 to 125 per cent cheaper and far and away better, transport better and cheaper by at least 100 per cent, taxes $2\frac{1}{2}$ per cent *ad valorem* duty on produce. Any one thinking of investing in Mexico, I should advise first of all to visit British Honduras. I see no reason why British Honduras should be worse than Mexico as regards soil and climate. It is a British colony and labour can be got from India under a five years' agreement and for 50 cts. a day without food, cost landed £10 a head, but irrecoverable.

"PLANTER."

CASSAVA OR MANIOC.

Matale, Nov. 26.

SIR,—With reference to the poison of the cassava or manioc referred to in your issue of the 25th, the natives hereabouts believe that some of the poison in the cassava is communicated by snakes who are said to be very fond of this vegetable and nibble at the roots whenever opportunity offers. Further as the manioc is planted as a fence tree along with the "endaru" which is supposed to be poisonous, the "endaru" is said to have infected the manioc with its poison. All careful housewives as previously stated, cut out the poisonous part of the cassava before they begin cooking. I understand that manioc is very extensively eaten in the Eastern Province and doubtless some of your correspondents there will be able to give valuable tips about the way to avoid the bad kinds. S.

IMPERIAL FISCAL FEDERATION—FOR COFFEE AND TEA.

United Planters' Association of Southern India, Incorporated.

Madras, Nov. 29.

DEAR SIR,—I beg to enclose for your information and for the favour of such comment as you may deem fit, a copy of a letter that has been despatched to a very large number of

Chambers of Commerce and other bodies concerned with trade in various parts of the British Empire. Trusting that you will view favorably the action that my Association has taken in the hope of bringing a very important subject under discussion,—I am, dear sir, yours faithfully,

HARRY ORMEROD, Secretary.

Madras, 11th Nov. 1900.

DEAR SIR,—At the annual meeting of this Association on 8t August, 1900, the following resolution was unanimously adopted :—

"That considering the critical condition of the tea and coffee industries, this Association do communicate with the Indian Tea Association, the Ceylon Planters' Association, the Indian Chambers of Commerce and the leading firms of merchants and brokers interested in tea and coffee, etc., in this country and in England and her colonies with a view to ascertaining whether a movement in favour of a commercial combination of Great Britain and her Colonies and India against the world (which would by a system of differential duties afford some protection to British-grown products and manufactures) would receive support."

This resolution may be said to have resulted chiefly from the recent revision of the French Tariff in regard to Imports of produce from (*inter-alia*) India, and the British Colonies and Dependencies. You are doubtless aware that the French Parliament, as an act of reprisal against Brazil, voted recently a law doubling the duties on coffee, tea, and spices imported from countries not having Treaties of Commerce with France or not enjoying Most Favoured Nation Treatment, among which are India, the British Colonies and Dependencies (with the exception of Canada). The French and Brazilians have made up their quarrel, but the French Tariff law, which was really directed against Brazil, still subsists. There appears to be reasonable ground for hope that it will not be put into force, but if it should, the consequence would be,—to use the words of the "*Economist*"—that the prohibitory tariff for Colonial produce would only be applied to countries, British Colonies among others, for which it was not intended.

Although it is possible that the French Government may be induced to reconsider the action referred to, yet what has been already done serves as an unmistakable warning of the grave risk to which British trade is at present exposed, and the burdens, it may at any time be called upon to bear.

It is felt that there is a strong and growing feeling in England and her Dependencies and Colonies, in favour of what may be termed an Imperial Fiscal Federation for the protection of British interests as against those of the rest of the world. The Association is desirous of eliciting your views on the subject, to co-operate for the purpose of submitting memorials to the Home Government and other Governments concerned, and would be glad of your advice as to the precise form such memorials should take.

If you have already made any move in the direction indicated, a copy of your proceedings would be welcome.—I am, dear sir, yours faithfully,

H. PERCIVAL HODSON, Chairman.

Harry Ormerod, Secretary.

GOURAMI FISH AND ITS SUCCESSFUL CULTURE IN CEYLON:

Galle, Dec. 1.

DEAR SIR,—I wrote an account some time ago of the various attempts that have been made to introduce Gourami into Ceylon, but I do not recollect stating that they would only thrive at sea level. I think that they would probably do well up to 1,000 feet in this climate, Nuwara Eliya has been proved to be too cold, as a large consignment of healthy fish died during the first night in their new quarters. This happened in 1893 or 1894.

Of the five fish which arrived last year, three died, mainly, I think, for want of suitable food. Though they fed greedily, they fell off in condition, and eventually died; while the two survivors, when turned out into a small pond where they could find their own food, throve well. I brought these two down to Galle, where, I believe, they are still flourishing. I have written to Mauritius for a further supply; but have had no reply yet. I hope that other attempts will be made to introduce this fish; but it is important that a suitable pond, well protected, and free from other fish, should be ready to receive the new arrivals. The difficulty in finding such a pond in Colombo is greater than would be imagined, and the best way would be to construct one specially for the purpose.—I am, sir, yours faithfully

GEORGE M. FOWLER.

HOW TO CHECK OVERPRODUCTION AND SECURE QUALITY OF TEAS —A PRACTICAL SUGGESTION.

The Laboratory, Hyde Park Corner,
Colombo, Dec. 7.

DEAR SIR,—Might I suggest the following partial remedy to minimise the *present* production, and improve the general quality of the tea coming into the market. It has been long known, and proved, that the young shoots after a medium or heavy pruning contain little material in their sap to produce a good liquor, and this is perhaps equally the case even when manure has been applied, especially if of a forcing character.

By leaving these shoots unplucked for a few extra weeks and then cutting back, the bush would have a much better chance of forming good wood and *root* grown and the temporary loss of leaf would be made up by the steadier flushes of better quality plucked at a later stage. As pruning is being carried out practically during every month of the year, there must be a constant supply of this immature leaf going both to the local and home markets, which can but do harm to the name of Ceylon tea.—Yours faithfully, M. KELWAY BAMBER.

CASSAVA AND ITS POISON.

DEAR SIR,—It would appear that the "poisonous" variety of cassava is harmless enough—and is in fact the better of the two—if properly treated. Dr. Alfred Nicholls, in his text book of Tropical Agriculture, says "sweet cassava may be used as a vegetable without preparation: but bitter cassava contains juice of a very poisonous nature. This poisonous juice, in which there is much hydrocyanic or Prussic Acid is fortunately dissipated by heat, and so the bitter cassava is commonly cultivated as it gives much larger returns than the sweet kind."

The same author goes on to show that there is a use even for the "poison," for he says, "The poisonous juice of the tubers of the bitter variety of the cassava plant should not be thrown away,

as it can be converted into a valuable product known widely as cassareep. The juice is simply boiled down until it becomes of the consistence and appearance of molasses. In this condition it is a powerful antiseptic, and it is capable of preserving all kinds of meat in a fresh condition for considerable periods. It is the basis of many celebrated sauces, and of the well-known *pepper-pot* of the West Indies. Thus by reason of the boiling process, this highly poisonous juice is converted into a wholesome food product, for which there is usually a ready sale in England and elsewhere."

We then have a reference to the carelessness by which deaths are caused through bitter-cassava poison, and the following valuable hint is given: "The Indians of Guiana use red peppers (chillies) steeped in rum as an antidote to the poison."—Yours faithfully, C. D.

"INDIAN TEA FOR INDIA" (AND CEYLON TEA FOR CEYLONESE?).

DEAR SIR,—With over two hundred millions inhabitants, fully seventy-five per cent of whom are capable of being converted into habitual tea drinkers, it seems absurd that India should still go on flooding the London Market with her teas without making any effort to capture the local market. No doubt a few futile attempts have been made by the Indian planters at odd times, but they have always failed for the simple reason that the tea was not presented to the natives in a way to suit their habits and requirements. The common idea seems to be that the natives will only buy the very cheapest low grade teas and these have been presented either in large packages or *not packed at all*, and then people wonder that so little Indian tea is consumed in the country. What is wanted is to study the native character and then to supply the market in the way best suited to their habits.

I remember writing on this subject more than 20 years ago, giving my own personal experience in selling teas amongst the natives in the rural districts, but little or no notice was taken of my letters. At that time, however, India was not turning out much more than half her present crop, and Ceylon had only just commenced to produce tea and the idea of over-production was scoffed at by most, if not all those engaged in the industry; but, now that we are actually face to face with over-production, my words may have greater effect.

If you will allow me the use of your columns I would like once more to give an account of my own attempt to introduce tea into the native bazaars which extended over two seasons and which though productive of very little good at that time, sufficed to convince me that an enormous trade might by done be supplying the article in the way best suited to the wants of the native community; and had I remained in India, and been given the opportunity, I felt sure of success. But let me give me a brief account of my experience and I will then endeavour to show what is needed.

My first attempt was made somewhere in the seventies entirely with black teas; and as cheap travelling was absolutely necessary, my arrangements were of the simplest. After loading several large bullock carts with about 10,000 lb. tea of all grades in one and two lb. packets, 5 and 10 lb. boxes and large quantities of *Bohea*, simply packed in bamboo baskets with paper lining, I hired a small single bullock hackery for myself and set off to traverse the rural districts and purely native towns, merely passing through the larger cities and perhaps halting for a day or two to rest myself and cattle. I generally took advantage of this halt to send a few hundred lb. of tea to an auctioneer (one or more of whom are to be found in every large city in India) and attending the sale myself (unknown even to the auctioneer) I would bid for the tea till it reached a reasonable figure and then step out. This was perhaps a bit of sharp practice and scarcely honourable; but I always stopped bidding as soon as a fair price was reached, and did not often buy in any quantity. Of course, some of the tea sold at these auctions was bought by residents for their own use, but most of it went to the native shop-keeper to retail to their customers. And now for my experience in the purely native districts.

Firstly, I soon found that the idea that natives would only buy the lower grades, was a great mistake. Nearly all the well-to-do native gentlemen would look at nothing but the very best tea, paying R2 per lb for O P rather than buy good *sou* at eight annas or *Bohea* at four annas. 2nd,—One lb. packets were easily disposed of, but 2lb packets were sold with difficulty and at a reduced price, while five and 10lb boxes could only be got rid of by bartering for goods to sell again upcountry. 3rd,—Most of the Muhammadans preferred *green* to black tea. They say that green tea is less heating than black, and therefore better suited for hot weather; how they got this idea I cannot say. Probably from the Afghans and Persians who all drink green tea. Acting on the above information, I took care to have a proportion of green tea the second time, and this sold readily, and I might have sold double the quantity of greens if I had taken it.

To capture this valuable market which might result in more than half the tea produced in India being consumed in the country, all the I P A have to do is to start a Company to make up small paper packets of tea to be retailed at one anna and half annas the best grades at one and the lower grades at half, the quantity of tea in each packet being made to suit the above prices. For instance the best O P could be put up in one-ounce packets to be sold for one anna, and the *Bohea* in two ounces to be retailed for half an anna—the other grades in proportion to their market value. These little packets should be enclosed in lead packets containing one dozen each or in air-tight tins. Then one or more travelling agents should be sent to scour the country and place these packets on commission sale with every respectable native shopkeeper all over the country. The Company should not rest till their packets are on sale in at least 50,000 shops. This would not be a difficult task. In every case where I tried them, I found the Bunniahs always willing to take tea on commission sale and render monthly accounts and write for more tea when they wanted it. They are generally honest enough in these matters and I don't think the Company would suffer much loss through them nor would the business be expensive in other ways, as little or no money need be spent in advertising and as soon as a demand sprang up, no doubt many of the shopkeepers would buy their requirements from the Company rather than take it on commission; but they would not do so at first.

In almost every large city in India, China tea is sold in small paper packets, for a few pice and this constitutes the chief supply, so far as the

natives and Eurasians are concerned, and is the sole reason why China tea still holds its own in the Indian bazaars. Neither the natives nor Eurasians keep tea caddies and object to buying even a lb. of tea at a time, hence the necessity for these small paper packets. And I am positive the Indian market will never be captured in any other way, but a one-anna packet Company worked as suggested above would be sure to succeed and work wonders in a few years.

I give the advice for what it is worth and the I. P. A. must be mad indeed if they do not give it a trial. If Ceylon had had such a promising market at her door we should never have heard of the tea cess or the XXX Committee; but even Ceylon need not send an ounce of dust or fannings out of the country. If a three-cent packet Company was started in Colombo on somewhat similar lines and it would put a stop to the sale of *rubbish* in the harbour, as the Company would naturally get the whole of that trade in their own hands. To start such a Company would not take a large capital and I should say any planter would be glad to take a ten-rupee share in it.—Yours faithfully, G. S.

TEA AND MR. BAMBER'S SUGGESTION.

DEAR SIR,—That was a very sensible letter of Mr. Kelway-Bamber (see page 490.) I agree with him, the temporary loss in manufacturing rubbishy tea from tippings would be more than made up by the extra root growth and good wood for pruning if the bushes were allowed to run. I had practical demonstration of this many years ago in the Kelani Valley when I knew very little about tea, and allowed the bushes (in about thirty to forty acres) to run and then passed the knife over them. The follow-ing year I had splendid wood to prune on and I am sure more than made up for the loss.—Yours faithfully,

WESTERN PROVINCE.

FLOWERS AND FLOWER-GARDEN.

DEAR SIR,—I enclose a cutting from an old *Magazine*, about the "Civilizing Effects of a Taste for Flowers."—Yours truly,

LEISURE HOUR.

Extract from "Civilizing Effects of a Taste of Flowers":—"The Parish of Arncliffe, near Skipton in Yorkshire, situated in a very wild part of the country, and inhabited by a wild and lawless tenantry, had been for many years without a resident clergyman, the living being a very poor one—not over £30 a year. The present incumbent, the Rev. Mr Boyd, determined, however, to set himself down among them, and to use utmost exertions in bettering their condition. To this end he surrounded his house with a fine garden, well stocked with lovely flowers, and induced his peasantry—but with great reluctance, to come in one by one to see and admire his flowers, and to take them home and to cultivate them. Now, for the first time they had light in their dwellings, and ultimately, through the kind and personal care which was bestowed upon them, they have become the most contented and happy set of villagers in all Yorkshire."

NEW GUINEA RUBBER.—I am glad to hear that the natives of New Guinea are beginning to understand the collection of raw rubber. At first they were inclined to cut down the trees in order to obtain the milk. They are, however, doing better now.—*Indiarubber Journal*, Nov. 26.

PLANTING NOTES.

RUBBER IN SANTA CRUZ.—A great discovery of india-rubber forests of vast extent has been made in the Department of Santa Cruz de la Sierra, and on the Magdalena in the Department of Beni, and also some exceedingly rich gold deposits. This confirms the traditions of the Jesuits, who knew something of that region, and who even worked its resources to some extent. In the Province of Caupolican, Department of La Paz, there have also been discovered some splendid forests, in which there have been found some rubber trees of a species not before known. In Bolivia the only species of rubber trees hitherto worked are those known as "Hevea," or "Siphonia Brasiliensis," but lately the species known as "Castilloa," which exists in Mexico, Colombia, Ecuador, Central America, etc, has been discovered. In the Province of Caupolican gutta-percha has been also discovered, which is very important. In order to facilitate shipments for the products of Santa Cruz and Beni, the Government has decided to open a port, with a national custom-house, on Laguna Gaiba, a beautiful creek of the river Paraguay, on its right bank at 17 deg. 48' S. latitude. The prolongation of the North Central Argentine National Railway from Jujuy to the frontier of Bolivia, and thence to the city of Potosi, is an enterprise which London capitalists might undertake to their advantage, as they could obtain very advantageous concessions from both Governments. —*India-Rubber Journal*, Oct. 15.

BANANA FLOUR.—The banana, which grows in almost all tropical countries, is very nutritive, and forms a nearly perfect food. It contains more than 25 per cent. of assimilable organic matter. According to Humboldt, it is forty-eight times more nutritious than the potato, while Crichton Campbell has stated that the banana is twenty-five times more nutritious than the best wheaten bread. The analysis of Thoms shows the presence in the flour of banana of 9·01 per cent. of nitrogenous matter. The best wheaten flour contains no more than 9 to 11 per cent. It is preferable to manufacture the starch from unripe fruits, because the starch is converted into sugar in ripening. In Venezuela the flour of the banana is given especially to children; it is equally good for aged people, convalescents, nursing women, and is of great service in the feeding of those suffering from complaints of the stomach. In Central America, Columbia, and Venezuela, the banana flour is prepared on a large scale, and sold under the name of Musarina. The flour of the banana may be used in the same way as wheaten flour, except for the preparation of bread, for which it is unsuitable, inasmuch as it contains no gluten. Various formulæ are taken from the *Tropenpflanzer* for preparing banana flour for dietetic use. Thus, a teaspoonful of the flour in a cup of chocolate or cocoa facilitates the digestion of these drinks, and renders them more nutritious. This addition enables cocoa to be taken by those whose stomachs are in a weak state. A sustaining drink may be made by adding a teaspoonful of the flour to an egg yolk beaten up mixed with milk, and sweetened with sugar. The sale of banana flour in London is insignificant, on account of its high price, and the fact that its uses are not yet understood.—*Revue des Cultures Coloniales*.

TEA COMPANIES' REPORTS.

CENTRAL TEA COMPANY OF CEYLON, LIMITED.

The Directors have the pleasure to submit the General Balance Sheet and Profit and Loss Account for the year ending 30th June, 1900, duly audited.

	£.	s.	d.	£.	s.	d.
The net amount at credit of Profit and Loss Account, including the balance brought forward at 30th June, 1899, and after providing for General Expenses, Directors' Fees, Income Tax, &c., is ...				2,867	0	2
Dividends on the 6 per cent preference shares were paid for 1899/1900 (less Income Tax) amounting to	1,299	7	6			
It is proposed to pay a dividend of 6 per cent (less Income Tax) on the Ordinary Shares which will absorb	1,054	10	0			
And to carry forward to next year a balance of ...	513	2	8			
				2,867	0	2

The Directors trust the results of the year's working of the estates will be deemed satisfactory by the shareholders, considering the fall in the market value of tea.

The gross average price realised for the tea was 7·03d per lb. as against 7·87d per lb. last season, and the rate of exchange was 1s 4 31-64d as against 1s 4 13-64d.

The yield of tea was 406,646 lb., being 454 lb. per acre over a plucking area of 895 acres.

The acreages of the estates are as under :—

Estate.	TEA. In bearing.	New clearings.	Cardamoms.	Forest Grass and Waste.	Total acreages.
Kabragalla ...	508	...	49	380	937
Somerset ... (Including Easdale and Loxa)	387	13	...	33	433
Total ...	895	13	49	413	1,370

Under clause No. 24 of the Articles of Association Mr. H. K. Rutherford retires on this occasion from the Board, and being eligible, offers himself for re-election.

THE GANGWARILY ESTATES COMPANY OF CEYLON, LIMITED.

REGISTERED OFFICES :—BILLITER SQUARE BUILDINGS, LONDON, E. C.

DIRECTORS :—Sir John J. Grinlinton, C.E., F.S.A., F.R.G.S., H. L. Tottenham, Esq., Theodore Stretch, Esq.

FOURTH REPORT OF THE DIRECTORS.—To be presented at an Ordinary General Meeting, to be held of the Offices of the Company, Billiter Square Buildings E. C., on Tuesday, the 16th October, 1900, at 3·15 o'clock in the afternoon.

The Directors submit herewith Balance Sheet and Profit and Loss Account for the twelve months ending the 30th June, 1900.

A new clearing of 27 acres has been made on Yelam-Mallai Estate and is being planted with Cardamoms. This will be increased to 40 acres, making the total clearing 100 acres and the cultivated area of all the Company's Estates 1,017 acres.

The crops of all the Estates have been in excess of estimates, but the advantage thus afforded has been almost dissipated by a further fall in prices. The total Tea made in the Season amounted to 499,029 lbs. costing 26 cents. per lb. free on board Colombo.

The total quantity of Tea sold amounted to 527,139 lbs. including 28,110 lbs. of bought leaf. Of this 126,264 lbs. was sold in Colombo at an average of 27¾ cents. and 400,875 lbs. in London at an average of 6·06d per lb.

The Cardamoms on Yelam-Mallai are reported to be growing well and a small picking may be looked for in the new season.

Estimates for the Tea Crops for the twelve months ending 30th June, 1901, point to a yield of 475,000 lbs. Every effort is being made to keep down cost and at the same time maintain the Estates in good cultivation.

The Profit and Loss Account, after paying Dividends on the Preference Shares to 31st December, 1898, shows a balance of £81 17s 9d brought down. The profit for the year, after writing off £382 16s 11d from buildings, machinery, &c., amounts to £974 9s 4d, which added to the above gives an amount of £1,059 7s 1d. Out of this the Directors have paid a half-years' dividend on the Preference Shares to the 30th June, 1899, leaving a balance of £740 17s 6d; they now recommend that a dividend be paid on the Preference Shares to the 30th June 1900, which will absorb £636 19s 2d, and leave a balance of £103 18s 4d to be carried forward. J. J. GRINLINTON, Chairman.

4th October, 1900.

THE CEYLON LAND AND PRODUCE COMPANY, LIMITED.

Report of the Directors, to be submitted to the Sixteenth Annual General Meeting of Shareholder' to be held at the Registered Office of the Company. Nos. 353 and 354, Leadenhall Hall House, 101, Leadenhall Street, in the City of London, on Monday, the 12th day of November, 1900, at 2 o'clock p.m.

Your Directors have the pleasure to submit the Annexed Profit and Loss Account and Balance Sheet for the Crop year ending 30th June, 1900, duly audited.

1,103 shares of £5 each, being part balance of the 6 per cent Cumulative Preference Capital, were allotted during the past year, and the premiums received, less cost of issue, transferred to Reserve Fund in the sum of £675.

The amount at credit of Profit and Loss Account is £8,262 17s 10d, which, with the sum of £986 3s 10d brought forward from last year, leaves £9,249 1s 8d to be distributed.

On the 21st July last an Interim Dividend of 7½ per cent. on the Ordinary Shares and 3 per cent on the Preference Shares was paid, and your Directors now propose to pay on the 15th day of December, 1900, the balance of the fixed Cumulative Dividend on the Preference Shares, 3 per cent, making 6 per cent for the year, and 7½ per cent. on the Ordinary Shares, making 15 per cent. for the year, all free of Income Tax. It is also proposed to transfer £1,825 from Profit and Loss Account to Reserve Fund, increasing that account to £20,000, to set aside the sum of £100 as a provision for possible losses on Coast Advance Account, and carry forward the balances of £1,473 1s 4d, subject to the Directors' remuneration for the year under review and to the payment of Income Tax, &c.

A sum of £1,575 spent upon permanent improvements during the year has been debited to Revenue.

Your Directors are pleased to report that the total Crop of Tea for the year exceeded the Estimates by 64,518 lb.; there were also increases of 64,091 lb. made from purchased leaf, and of 43,486 lb. made for others, the total excess amounting to 172,095 lb. It is a matter for regret, however, that the general

net average of the Company's Teas has fallen from 6.78d. to 6.21d. per lb.; during the same period exchange showed an advance, and Freights were on a par with those of 1898-99.

Your Directors have to report a shortage in the crop of cocoa marketed from the Alloowiharie and North Matale Groups. The estimates framed at the commencement of the season for these properties provided for 2,400 cwts., but the intake therefrom amounted to only 1,436 cwts. This shortage, in the opinion of your board, is mainly attributable to the abnormal weather experienced, but there is no doubt that "canker" is also responsible in a measure. Every precaution is taken to prevent the disease from spreading, and latest advices from the affected properties (North Matale and Alloowiharie) are to the effect that it is becoming less prevalent; the Cocoa on your other properties is, so far, quite free from disease.

During the financial year a total sum of R28,000 has been spent on Manure and its application to Tea and Cocoa, the whole of which expenditure has been charged to Revenue; it is intended to continue generous treatment.

A census of Coconut trees was taken at close of the year, shewing a total number of 40,195 planted amongst other products; this is equal to 530 acres at the rate of 76 trees per acre.

TEA.—The Market opened after the turn of the year, with a good general demand, and steady prices for nearly all descriptions. In the early spring months the Trade were much engaged with clearances, in anticipation of a rise in Duty. This actually took place, to the extent of 2d per lb, in March, after which there was less disposition shewn to purchase, and as supplies at Auction continued abundant, with a large percentage of poor liquoring and and unattractive parcels offering, the average gradually declined until June, when it stood at 6⅝d per lb; by that time the value of common leafy kinds had from January 1st fallen from 6d to 5d per lb, Later on some improvement was discernible in quality, and although Public Sales remained heavy, this, together with actual reduced shipments and smaller telegraphic estimates, somewhat restored confidence, so that the result became gradually more favourable, the average being 7½d per lb for the month just ended.

From 1st January to 31st ultimo 1,111,700 packages of Estate Tea passed through the Mincing Lane Sale Rooms, realising 7¼d. per lb., against 8d. per lb. for 964,500 packages, and 7¾d. per lb. for 984,300 packages, in the corresponding ten months of the two preceding years.

The most noticeable feature presented by the Market throughout a great part of the period under review was the depressed condition of medium grades quotations for which, at times, were but little removed from those current for good common and fair, partly attributable to the unattractive selection sent home. For really choice flavoured invoices there was a good enquiry throughout. In view of the anticipated increase in the year's output to 142 million lb., contrasted with total shipments from the Island in 1899, which were 129 million lb., it is satisfactory to notice that the growing demand from outside quarters has induced larger shipments from London to meet it, and also brought about more direct business from Colombo with Australasia, Russia, and America, the amount sent from the Island to these countries for the first nine months of the year being—

1900.	1899.	1898.
TO AUSTRALIA.		
12,894,000 lb.	11,967,000 lb.	11,259,000 lb.
TO RUSSIA.		
6,657,000 lb.	2,719,000 lb.	1,915,000 lb.
TO AMERICA.		
3,463,000, lb.	2,344,000 lb.	1,870,000 lb.

COCOA.—It is gratifying to report that prices this year have attained a higher level than those of any time since 1893. the advance having been gradual and continuous, mainly attributable to the increasing general demand, and the falling-off in supplies from the island which have been about 40 per cent less than last year, and about 30 per cent less than 1898. The quality has shewn no improvement upon last year's out-turn, parcels of good and fine bright red being again in sm ll proportion to the bulk of the crop, and consequently the attractive lots have realized good prices. A parcel from the Company's Alloowiharie Estate obtained 102s 6 l per cwt, being the highest price of the season, and above any secured since 1893. The future of the article appears favourable, consumption shews a continuous improvement, and a further increase in production would not materially affect values.

ACREAGES.—The following Statement shews the approximate acreage of the Company's Properties at date:—

Name of Estate.	Tea. 1 yr.	Tea. 2 yrs.	Tea. 3 yrs.	Tea. Over 3 yrs.	Cocoa. Bearing	Cocoa. Not bearing.
Alloowiharie Group ..	—	—	117½	97	263	84
Andangodde Estate ..	—	—	16¼	160	—	—
Fetteresso Estate ..	5	—	—	405	—	—
New Peradeniya Est.	—	—	1¾	382¾	17½	2
North Matale Group.	—	18	13	376	721	10
Owella Estate ..	—	—	—	—	13	205*
Rickarton Estate ..	2	—	12	526	—	—
Strathisla Group ..	39½	58	48	114	91¾	82¼
Forest Land ..	—	—	—	—	—	—
	46½	76	208½	2,060¾	1.106¼	383¼
		2,391¾			1,489½	

* And Tea.

	Cocoa, Coffee, &c.	Forest, Grass, Chena, abandoned, &c.	Total Acreage.
Alloowiharie Group...	116¼	15	692¾
Andangodde Estate...	—	—	176¼
Fetteresso Estate ..	—	28	438
New Peradeniya Est.	—	54½	458½
North Matale Group..	85	354	1,577
Owella Estate ..	—	239	457
Rickarton Estate ..	—	56	596
Strathisla Group ..	—	5¼	438¾
Forest Land ...	—	430	430
	201¼	1,181¾	5,264¼

N.B.—In the absence of detailed surveys these figures, as mentioned above, are approximate only.

The Estimates for current year provide for a Crop of 945.5 0 lb Tea from the Company's Estates, and 265,000 lb from bought leaf and Tea made for others, totalling 1,210,5 0 lb. The Crop of Cocoa is estimated to be 2,1 5 cwts. At the higher elevations the intake of Tea at date shews a marked falling-off as compared with last year, but your Directors trust the present shortage will be overtaken It is too soon to speak with any certainty regarding Cocoa, but, given favourable weather, it is hoped that a fair Autumn Crop will be harvested.

By Order of the Board, JAMES WILSON, Chairman. ALFRED E. LOCK, Secretary.

PEPPER, COFFEE AND TEA IN THE WYNAAD.

THE WYNAAD TEA COY., LTD.

The ordinary general meeting of the Wynaad Tea Company, Limited, was held at the office of the company, 7, Mincing Lane, E.C., on Monday last. The chair was occupied by Mr: J C Sanderson, chairman of the company.

The CHAIRMAN, in moving the adoption of the report and accounts, said: When the directors had the pleasure of meeting you last year I remember I told you we thought the prospects for the then current season, viz., 1899-1900, were encouraging, and that we looked for a crop of 78,000 lb. of tea, 20 tons of pepper, and 18 to 20 tons of coffee. Unfortunately, these crops were not marketed, so our hopes have been disappointed. Had we secured those crops they would have given us within about £200 to £300 of the working expenses of the season, which was all the board looked for. The pepper and tea crops turned out fairly well, but coffee failed us, and we picked barely ten tons, while the price realised was very low in consequence of the state of the market; hence the deficiency of £1,446 17s 4d, as stated in the accounts. I would, however, like to point out that this deficiency is so large because £1,266 18s 5d has been credited to the block account, being the proceeds for the tea from the acreage which is not yet in full bearing. The latter part of the season was a most trying time for both coffee and tea, as they had the longest drought in the Wynaad experience for many years, which drought injured the coffee trees to such an extent that we picked, as I have already told you, half our estimate, and it was only very late in the season that the board was aware of this serious deficiency. With regard to the tea crop, up to the end of October we were fully 7,000 lb. ahead of the estimate, but the long drought stopped the flushing of the bushes, and the final outturn was about 2,000 lb short of what we had expected. Our pepper crop turned out larger than the previous year, although rather below the estimate. To turn to a more pleasant subject, I am glad to be able to report that the outlook for the current season is so far satisfactory, although the past monsoon has been an exceedingly heavy one, indeed so heavy that some miles of the Ghat (the Government road) was washed away. (This damage has since been repaired.) Mr. R K Walker still considers his estimates are fairly safe. At the date of the last letter from our superintendent, viz, October 13, he reported that the quantity of manufactured tea was 67,453 lb. which was 27,266 lb ahead of last year, thus we have received nearly half our estimate, and we have the heaviest months to come. He said that although some little injury had been done to the pepper vines by the excessive rains, he did not think it necessary to revise that estimate. I have, however, the pleasure to report that we have just sold the crop at the price of 6½d. per lb. being ½d. per lb, more than last year. As to coffee, the latest report is, they were expecting to begin picking the crop about the end of October, and hoped to get the estimate of 35 to 40 tons, but as every coffee grower knows, there are always so many surprises in store for him up to the very last hour of harvesting his crop, that it is quite impossible to depend upon estimate. I do not think the directors will sell this crop for arrival, as prices ruling are so low that it is better to take the chance of the market improving. I should like to call your attention to the fact that we have planted a further fifty acres with tea, making the area now opened up to 630 acers, so that year after year we may expect an increasing yield of this product, Our cost of production is, I am glad to say, very moderate, and compares favourably with other tea-producing countries. At present we estimate we can put our tea, f.o.b., at slightly under 4d per lb, and as the yield per acre increases, that figure will, of course, be further reduced. You will notice from the report that the policy of the board will continue to be the development of this tea industry indeed, we would have liked to have planted a further fifty acres during this season, but, in in face of the deficiency for the working of 1889-1900, the directors decided to await the result of this current year's trading, before any further capital expenditure was authorised. The directors, however, after having consulted Mr. R K Walker, decided to plant, as a catch crop, a certain area of the Adelaide Estate with chillies, and also to put out a small quantity of ledger bark seed which they were able to procure from the Government gardens in Java. The cost of this work will be trivial, so you see, gentlemen, your directors in England, and Mr. R K Walker in India do not allow the grass to grow under their feet; indeed, they watch the welfare of your company with the greatest care, and at the same time endeavour to work the estates with every possible economy compatible with efficient management and sound cultivation. —*Home and Colonial Mail*, Nov. 9.

THE UKUWELA ESTATES COMPANY, LTD. ANNUAL REPORT.

Report of the Directors, to be submitted to the shareholders at the second annual general meeting to be held at Ingram House, 165, Fenchurch Street, London, E.C., on Friday, the 16th day of November, 1900, at 2-30 p.m. The Directors beg to submit herewith the accounts of the Company and their report for the year ending 30th June, 1900, showing a balance at credit of Trading Acoount of £2,373 1s 9d.

After payment of Debenture Interest and Establishment charges, there remains a disposable balance, including £37 12s 7d brought from last year, of £1,190 11s 7d, and which the Directors have dealt with as follows:—

One-third of Preliminary expenses written off ..	£226	15	11
Depreciation of Machinery, Plant, &c. ..	100	0	0
Preference Dividend for Year	567	0	0
Dividend on the Ordinary shares at the rate of 3½ per cent. per annum ..	264	5	0
Balance carried forward to next year ...	32	10	8
	£1,190	11	7

Owing to the very dry weather which prevailed during the greater part of the year, the crop secured amounted to only 273,510 lb. Tea, being equal to 790 lb. Tea per acre over the plucking area of 346 acres (33 acres of which were plucked for the first time), against 927 lb Tea per acre, from 313 acres plucked during the former year.

The net average price of the Tea was 5·02 pence per lb. against 5·12 for last season. Cocoa and other credits amounted to £478 0s. 11d, against £201 3s. 3d. secured last year.

The Trading account shows a working expenditure of £3,710 16s. 8d. This includes a sum of £415 0s. 5d. spent on manuring 166 acres of Tea, and from which little return has been secured during the year under review. The Estate, however, will reap in a larger measure the benefit of same during the current season. The cost of production works out at 3·13 pence per lb. Tea, which includes cost of manuring, also £85 18s. 3d. loss on exchange, but excludes £233 9s. 8d. the amount spent on Cocoa and securing other credits. Last year's cost of production was 2·87 per lb. Tea. The increase arises entirely from the smaller crop secured, as compared with previous year, and the cost of manuring as mentioned above.

The accounts are worked out at an exchange of 1/4 per rupee. The actual rate of exchange averaged 1/4 23-64, thus accounting for the difference of £85 18s. 3d. as per Trading Account.

The prices secured for the Teas during the Autumn and Winter were satisfactory. However, since then there has been a considerable fall and at present prices continue at a low range for common and medium quality Teas.

Your Director in Ceylon estimates for the present season 300,000 lb. of Tea, which should be secured if weather continues of normal, as up to the end of the first quarter of the current year 82,160 lb. Tea had been secured, whilst the amount for corresponding period last year was 56,476 lb. The Cocoa crop is estimated at 90 cwt.

Capital expenditure for year ending 30th June, 1900, amounted to £429 9s 11d ; this sum includes cost of a new roller £172 14s 2d, the balance, £256 15s 9d, having been spent on factory and on cultivation of the Tea not yet in bearing.

The present acreage is as follows, viz. :—

Tea in full bearing	..	346 acres.
Do to be plucked during season 1900-1901	..	19 do
Do not in bearing	..	33 do
Cocoa	...	74 do
Grass Land	...	7 do
Reserve Land available for cultivation	..	79 do
Total	..	558 acres.

Mr. W B Anley, Director, retired in June last. Mr. J P B Anley, Director, retires in accordance with the Articles of Association, but being eligible, offers himself for re-election. Messrs. Woodman Tulloch and Edds, the Auditors, retire, but offer themselves for re-election.

F. G AMBROSE and J. P. BENTLEY ANLEY, Directors; T. W. PALMER, Secretary.

London, 7th Nov. 1900.

THE CEYLON AND INDIAN PLANTERS' ASSOCIATION, LTD.

THIRD ANNUAL REPORT, 1899-1900.

The Directors beg to submit their Report and the Audited Accounts for the year closing 30th June last.

TEA.—The crops have exceeded the estimated yield by 67,009 lb., and show an increase over the corresponding twelve months of 135,204 lb. of made Tea. Markets have, however, been lower owing to increased supplies, and no doubt the higher duty has also to some extent had an adverse effect on prices, the result to this Company being that profits earned during the twelve months show a decrease of £631 15s 5d, which, however, is more than counterbalanced by profits on Plumbago, detailed below.

The crop has weighed out 807,009 lb. of made Tea, and the estimates for the current year are 850,000 lb. The Kandaloya Garden still gives a very disappointing result, but the Directors are hopeful that as more Tea comes into bearing this year, returns from this place will be more satisfactory.

The following table gives full information as to cost of production, &c., &c. ;—

ANALYSIS OF THE YEAR'S WORKING.

	Total Acreage.	Acreage in bearing and partial.	Acreage planted not in bearing.	Average rate of Exchange	Cost per lb. cts. & sterling (Manure included).	Gross Average Sale price per lb.	Nett average Sale price per lb.	Loss in Weight, Draft, &c.	Profit per Acre in bearing.	Yield per Acre made Tea.	Crop made lb.	Original Estimate 1899-1900 lb.	Estimated Crop 1900-1901 lb.	Estimated cost per lb. Colombo 1900-1901. cents.
Laxapana ..	1021	768	67	1/4 15-32	24·87 Colombo 4.10d	7.01d	6.00d	1.75 %	£3 6 2	422 lb.	323,833	280,000	328,000	26.97
Maha Eliya.	305	263	36	1/4½	27.79 Colombo 4·58d	7.84d	6.82d	2.22 %	£4 3 6	497 lb.	130,526	130,000	137,000	27·68
St. Andrew's	760	592	35	1/4 15-32	26.85 Colombo 4.42d	7.23d	6.20d	1.81 %	£2 10 0	326 lb.	192,976	175,000	205,000	29.40
Kandaloya..	1006	180	110	—	30.89 Colombo 5.09d	Sold in London 6.53d / Sold in Colombo 34.70c.	5.33d / 33.67c.	11,025 lb. 2.39 % / 148,470 lb. 0.21 %	0 9 2	333 lb.	159,674	155,000	180,000	29.43
Total	3092	2103	248	1/4 15-32	27.04 Colombo 4.45	7.13d	6.06d	1.62 %	£2 10 9	384 lb.	807,009	740,000	850,000	

(Continued.)

ANALYSIS OF COSTS F.O.B. COLOMBO.

	Laxa-pana.	Maha Eliya.	St. Andrew's.	Kandal-oya.
Superintendence	2.58	2.87	3.26	4.06
House Coolies	.31	.29	.26	.43
Bungalows	.02	.44	.07	.01
Lines	.06	.02	.15	.33
Factories, &c.	.15	.34	.29	.22
Machinery	.10	.33	.06	.21
Cattle Sheds	—	.15	—	—
Contingencies	.41	.56	.41	.61
Fire Insurance	.18	.25	.33	.35
Water Conrse	—	.01	.17	—
Visiting Fees	—	.76	—	.31
Snpplying	—	—	.01	
Roads, Drains, &c.	.36	.24	.79	.51
Weeding	2.92	2.16	3·39	4 47
Pruning	.88	.69	.86	1.89
Forking	.21	.03	.18	.59
Cost of Manure	1.40	1.67	.62	.40
Application of Manure	.88	.51	.22	.10
Tools	.11	.04	.16	.11
Stock	.16	—	.01	—
Plncking & Baskets	8.65	10.18	9.56	9.18
Manufacture, Packages, &c.	3.46	4.21	3.87	5.14
Transport to Colombo	1.30	1.27	1.47	1.85
Shipping Charges	.69	.69	.69	.04
Sundries	.04	.08	.08	.08
Cost in Cents per lb.	24.87	27.79	26.85	30.89

PLUMBAGO.—The discovery of this mineral on Laxapana, which was notified to the Shareholders under date of the 25th January last, has proved of much importance to the Company, and the Directors are able to add a sum of £1,585 1s 4d to the profits from Plumbago mined and sold up to the 30th June last, and showing the result of seven months' work. Mining is being carried on, and about 15 to 20 tons a month are now coming in. The Company is endeavouring to engage a competent miner so that the works may be developed to the best advantage, for up to the present there has been but little more than surface work done. Mr. George Greig reports that there is evidence of large deposits, and is sanguine that the veins will improve at depth, and that an increased ontput will be secured during the current season.

The Accounts show that after paying interest on debentures, interest to agents, preference share dividend, and Manager's commission, Directors' fees, etc., there is a balance at credit of Profit and Loss of £2 413 4s 8d. The Directors propose to write off £300 from Machinery Account; £950 from Preliminary Expenses ; and £348 16s 3d from Debentu e Issue Expenses Account, and to pay a dividend of 2 per cent., free of Income Tax, on the ordinary shares. In appropriating an amonnt equivalent to more than 3 per cent on the Ordinary Share Capital to the extinction of the two latter accounts, the directors believe that they are acting in the best interests of the Company, and they trust that in future years they may be able to recommend larger dividends.

The directors desire to record their thanks to Mr George Greig and the Staff in Ceylon for their care and attention to the business of the Company during the period under review.

DIGALLA CEYLON TEA ESTATE, CO., LTD.

Report of the Directors to be snbmitted at the fourth annual ordinary general meeting of shareholders to be held at 20, Eastcheap, E.C., on Tuesday, 4th December, 1900.

The Directors herewith submit the general balance sheet and profit and loss account for the year ending 30th June, 1900 duly audited.

	£ s. d.	£ s. d.
The net amount at Credit of Profit and Loss Account, after providing for General Expenses, Directors' Fees, Income Tax, &c., is ..		500 0 8
Dividends on the six per cent Preference Shares were paid for 1899-0 (less Income Tax) amounting to	346 10 0	
Leaving to carry forward to next year a balance of	153 10 8	
		£500 0 8

The Directors agaiu regret that the year has not been a favourable one on the Digalla estate.

The crop has turned out 8½ per cent under the estimate which was formed at the beginning of the year, but this can be fully accounted for by the fact that the rainfall has been 26 per cent under the average of the past eleven years, the average fluctuation from year to year being only 10 per cent. The shortage of crop has rendered the expense of cultivation much greater than would otherwise have been the case, and this, coupled with a decline in the market value of the produce, places the Directors again in the position of not being able to declare a dividend on the ordinary shares.

The acreage of the Company's property is a follows :—

Tea in bearing	.. ..	550 acres.
Tea not in bearing	... ...	50 do
Jungle	.. ...	151 do
Total	...	751 acres.

The gross average price realized was 6.26d per lb., as against 6.84d per lb. last season, and the rate of exchange 1s 4 15-32d, against 1s 4¼d. The total crop amounted to 201,622 lb. plucked off 550 acres, of which 32 acres are in a partial bearing, giving an average of 366 lb. per acre.

PLANTING NOTES.

CULTIVATION OF EGYPTIAN COTTON IN INDIA.—An experiment which gave definite results in Betul (Central Province of India) during the year, was the cultivation of Egyptian "Abbasi" cotton as an irrigated *rabi* crop. A small crop was raised by one *Motilal, Patel of Badora*. The crop was valued by the Manager, Empress Mills, Nagpur, at R96 per *bhoja*, as against R65 ordinary *bani* The seed was sown at the end of September in light black soil, and watered about once a week till the end of the cold weather, after which it was irrigated once every three or four days. The amount of watering was excessive, and had the effect of shrivelling the bolls so that although the plants were strong and flowered freely, the outturn was small. Farm experience has shown that one, or at the most two, waterings a month are ample for this cotton even in the hottest months. The Deputy Commissioner considers that this cotton can be grown in Betul as a rabi crop with irrigation, and that it would be exceedingly interesting so see the effect ot less watering. The Deputy Commissioner is of opinion that if a fair outturn can be obtained, the crop should be of the greatest use to cultivators. This experiment will be prosecuted further.—*Egyptian Gazette*, Nov. 28.

INDIAN CATTLE-BREEDING SCHEME.

THERE is a tendency at the present day to follow the example of India, and even in the case of education Ceylon is about to adopt the Indian system. We should like to see, however, the spirit of liberality and philanthropy, so much in evidence in India, infecting the people of this island. Owing to the appalling loss of cattle in Guzerat there is a great scarcity of animals there for agricultural purposes. In order to supply this want, a scheme (which originated with the Governor of Bombay) has been set on foot for preserving that excellent breed of both draught and milch cattle. The scheme provides for the lease of 2,000 acres of grass land, for the procuring of 400 of the best cows, for ring-fencing the land, for a supply of fresh water and constructing yards and shelter sheds. The farm is to be under a superintendent, and the cattle-keepers of the district who have lost nearly all their animals, will be employed as herdsmen. The male calves will be disposed of as yearlings to the natives for breeding purposes. According to the estimate made, a sum of at least half a lakh is required to start the scheme, and an annual expenditure of R4,000 is anticipated for the first four or five years, after which the farm is expected to be self-supporting. The absence of any expectations of *profit* is indicative of the liberal principles on which the scheme is based. The sordid element of a return in revenue for money expended (an element which, we regret to say, is apparent in nearly every local measure intended for the good of the people) does not mar this scheme, the highest hope of which is that after some years the farm will support itself. The details of the project are in the safe hands of Mr. Mollison and Mr. Leley, and the funds for working the scheme are being provided by voluntary subscriptions, the Governor of Bombay heading the list with R1,500 and a number of others —Civil Servants, Merchants, etc.—following with R1,000 each. It is intended to form a trust for the administration of the fund. A letter signed by the Governor's Private Secretary commends the scheme, on behalf of His Excellency, to the favour of the public. We quote the final paragraph from this communication :—

"His Excellency, in now placing the scheme before the public, is confident that its objects are such that it cannot fail to command widespread sympathy and hearty support. He desires hereby to thank most cordially those gentlemen of Ahmedabad who have in so practical a manner testified to their agreement in the benefits which it is to be hoped will be derived from the scheme and so generously contributed towards its funds, besides agreeing to make over their cows for breeding purposes at less than market rates. His Excellency feels assured that this is a scheme which must appeal most strongly to all who are interested in the welfare of the country, and it will be a matter of the deepest gratification to His Excellency if he can hereafter feel that he has been personally connected with a measure to promote the well-being of a Province which has been so terribly afflicted by the recent famine."

COFFEE PLANTING IN COSTA-RICA. WALKER'S PULPERS.

(By the son of a Ceylon Missionary, born in the island.)

Extract from a letter lately received from archi Costa Rica, Central America :—"It is not too much to repeat my thanks for the 'Coffee Planter's Manual' (Ferguson's) which you sent me. I consider that the mere perusal of the articles relating to artificial manuring, which are really only summaries of planters' experiences in that part of the business, influenced our proprietors to adopt the practice on their estates, the result being that in August, I received a shipment of 30 tons of a well-known coffee fertilizer (Ohlendorffs's) from London, and a confirmation of a previous order to pick up or purchase all such manures as cattle-dung and cane trash that can be got cheap and handy, without limit.

"When the Boston people come down next month, I will draw their attention to Walker's Pulpers and shall be very glad if you will send me one of their catalogues with prices. There is a probability of a further extension of our business operations in the near future in the shape of the introduction of new machinery of larger capacity and greater working power and of making advances to the native farmers for the delivery of their coffee to us. We have lately imported a monster turbine for the—station where improvements on a large scale have been projected."

RIVAL FERTILISERS.

NITRATE OF SODA AND SULPHATE OF AMMONIA.

The rival claims of nitrate of soda and sulphate of ammonia as fertilising substances for agricultural land have for a number of years been the subject of much spirited debate. There are many experienced farmers who pronounce unreservedly for sulphate of ammonia as the best nitrogenous accompaniment to mineral manures, while the majority perhaps hold as firmly to nitrate of soda as the more effectual dressing. This sharp conflict of opinion is not surprising in a sense, for the acute dissension that exists on almost every point connected with the wide subject of manuring is one of the most remarkable features of modern farming. A closer examination of the testimony arrayed on either side of this long-standing debate, however, reveals traces of argument somewhat removed from the region of practical and unbiased evidence. The peculiar circumstance connected with the use of the rival nitrogenous manures is that the respective sides rigidly adhere to the substance of their fancy, whatever may be the character of the crop or of the soil. Unprejudiced discrimination seems to be conspicuously absent, for the two materials seem to be seldom found on the one holding. A searching investigation of the relative merits of the two manures does not confirm the wisdom of the exclusive use of either of the invaluable materials. The substances are really less antagonistic than is usually supposed. They are similar in their chemical contents but essentially different in their fertilising effects, and consequently the one substance is often incapable of economic substitution by the other, as is intelligently shown by Professor Warrington in the paper that appears over his name in the Royal Agricultural Society's journal. Nitrate of soda is, of course, the more speedy in its action, and is thus peculiarly adapted for application as a top dressing when the established plants appear to need encouragement. It is also more effectual in dry seasons than sulphate of

ammonia. The latter, however, is a highly advantageous manure for spring application, along with phosphatic and potassic materials, and while nitrate of soda usually gives the better yield as measured by bulk, sulphate of ammonia is the more efficacious in improving the quality of the crop. The selection of the nitrogenous dressing is distinctly a matter for careful and intelligent discrimination, and not, as is often supposed, one on which the fancy of the individual may be humoured with impunity.—*The Field.*

SUNSPOTS AND RAINFALL.

Among the papers presented at the meeting of the Royal Society, was one by Sir Norman Lockyer and Dr. W. J. S. Lockyer on "Solar changes of temperature and variations in rainfall in the region surrounding the Indian Ocean."

PULSES OF RAINFALL.—The authors' object in studying rainfall was to ascertain whether the *plus* and *minus* temperature pulses in the sun were echoed by *plus* and *minus* pulses of rainfall on the earth.

INDIAN FAMINES.—Unless the pulses either overlapped or became continuous, there would obviously be intervals between the ending of one and the beginning of another. The *plus* and *minus* pulses, to which attention had chiefly been directed, were limited in duration, and when they ceased the quantity of water falling in the Indian area was not sufficient without water storage for the purposes of agriculture. They were followed, therefore, by droughts, and subsequently, at times, by famines. Thus, taking the period from 1877 to 1889, there was rain from the *minus* pulse in 1877-78-79 (part); no rain pulse in 1879 (part)-80-81 (part); rain from *plus* pulse in 1881 (part) 82-83-84 (part); no rain pulse in 1884 (part)-86-87; and rain from the *minus* pulse in 1887 (part) 88-89. All the Indian famines since 1836 had occurred in these intervals, carried back in time on the assumption of an 11 year cycle. Thus, taking 1880 as the central year on the ascending curve, it was itself a year of famine in Madras and the North-West Provinces; also

1880 minus 11=1869, N.W.P. famine (1868-69)
1869 minus 11=1858, N.W.P. famine (1860)
1858 minus 11=1847,
1847 minus 11=1836, Great famine in Upper India (1837-38).

Again, taking 1885-1886 as the central years on the descending curve:—

1885-86, Bengal and Madras famines (1884-85)
(1885-86) minus 11=1874-75, N.W.P. famine (1873-74) Bombay famine (1875-76) Bombay and Upper India famines (1876-77)
(1874-75) minus 11=1863-64, Madras and Orissa famines (1865 66)
(1863-64) minus 11=1852-53, Madras famine (1854)

It was clear from this table that if as much had been known in 1836 as was known now, the probability of famines at all the subsequent dates indicated might have been foreseen. The dates might also be carried forward from 1880; thus—

1880 plus 11=1891, N.W.P. famine (1890) Madras, Bombay, and Bengal famines (1891-92)
(1885-86) plus 11=1896-97, General famine

Famine years in India were usually years of low flood in Egypt. and it might be pointed out that the highest Niles followed, at an interval of one or two years, the years of the *plus* and *minus* pulses. As to the great Indian famine of last year, the widened line curves, so far from having crossed in 1897 or 1898, as they ought according to the few precedents available, had not crossed even now; in other words, the condition of ordinary solar mean temperature had not even yet been reached. Now India in a normal cycle was supplied from the southern ocean during the *minimum* sunspot period, and the rain was due to some pressure effect brought about in high southern latitudes by the sun at *minus* temperature. But as this temperature condition was not reached in 1899, as it would have been in a normal year, the rain failed. Thus the only abnormal famine recorded since 1836 occurred precisely at the time when an abnormal effect of an unprecedented *maximum* of solar temperature was revealed by the study of the widened lines.—London *Times*, Nov. 23rd.

INDIAN TEA ON THE CONTINENT.

Turkey.—Mr. George Gatheral has been engaged as the Agent of the Association in Constantinople, as suggested by Mr. Harington. I would suggest consignments be sent to an address I would give in Syra, where the tea would lie in bond, and we would then avoid paying duty and being forced to sell to save such duty while I could direct such sales as made to Trebizonde or Russia.

Holland.—The London Committee have resolved to assist the National Tea Union, as recommended by Mr. Harington, by contributing an equal amount of money to that fund by them for the purpose of advertising in Holland, up to a sum of £300. [Surely this is a mistake! We have always said that the Java tea-planters should exploit Holland and send none of their teas to London.—ED. *C.O.*]

Italy.—The London Committee have authorised Mr. Harington to suggest to Miss Babbington (English Tea Rooms) a grant of a sum of £50 towards advertising and pushing Indian tea in Rome.

Germany.—The London Committee although they fear they cannot start a tea house as proposed by Mr. Harrington, are willing to subsidise a firm which might be prepared to initiate one. The matter is still engaging their attention.

My own wish and aim is—

1. To secure a General Agency in Germany for the Indian Tea Association.
2. To establish an "Indian Tea House" in Berlin where tea can be sold both in cup and packet.
3. This to form a distributing centre for all Germany, opening branch agencies in all chief towns, and being charged with care of extensive advertisement, supervised by myself.
4. The cost of such advertisement up to a sum not exceeding say £500 per annum for a fixed period of three to five years to be paid by the Association, subject to conditions. The founding and first year's cost of the "Tea House" in Berlin also to be borne by the Association up to a lump sum not exceeding £1,500.
5. Supply of tea, chiefly Indian, and in any case British-grown only, to be arranged through myself, who will undertake all working details and be responsible to the Association—

(*a*) For quality of tea supplied submitting sample.

(*b*) For control of advertisement and general supervision in the Association's interest.

I regret that up to the present no arrangements on these lines have been completed; further negotiations can, however, be carried on and may be brought to a practical result in course of time. —*Indian Planters' Gazette.*

SOURCES OF TEA SUPPLY.

(To the Editor of the *New York Herald*).

The news from India of a short rainfall in the tea districts, published and commented upon in the *Herald* is of considerable interest to the public as well as to the trade.

The trouble in China is likely to affect the next season's supply more than it has this year's, as the China season happened to be an early one. The movement of the crop was further accelerated by the troubles, and it was rushed down to the coast ports very early. The pinch will probably come next season, and no doubt the market here will respond before spring.

The other sources of the world's supply of tea are Japan, which last season sent about forty-one million pounds to North America (the amount given in the *Herald* as the entire crop of 1888), and India and Ceylon. The crop in the latter two countries in 1888 was about one-third of the quantity now produced.

India shipped about one hundred and eight million pounds last season and Ceylon about one hundred and thirty million pounds. Increasing quantities of these teas are coming to both the United States and Canada, and if the troubles in China are not soon settled we may see the tea from that country entirely displaced here and to some extent in Russia.

WHITTALL & Co.

New York, Oct. 9th, 1900.

MICA AND GRAPHITE IN ZULULAND.

The following are extracts from an official Geological report, published in the *Natal Mercury* of Nov. 22 :—

MICA.

The mica properties in the Nkandhla district, near Fort Yolland, are still held, but no work of importance has recently been done on them.

GRAPHITE.

It will be noticed that the prospecting areas in the Impetyini Forest, in Alfred County, have been given up. The prospectors found they could do nothing with them.

All officers returning from South Africa have received 61 days' leave. *Reuter*—in *Egyptian Gazette.*

NOTES FROM THE STRAITS.

MR. STANLEY ARDEN'S FIRST IMPRESSIONS.

Dec. 6th.

Mr. Stanley Arden, recently appointed Superintendent of Government Experimental Plantations in the Federated Malay States, who stayed a month in Ceylon (chiefly at Peradeniya) on his way out to the Straits, writes as follows to a friend in Ceylon :—" Since my arrival, my time has been taken up with travelling in this and the neighbouring states, so as to gain a knowledge of the chief requirements of local agriculture. Everywhere I have been, coffee is by far the largest crop grown. Its cultivation, however, is being gradually abandoned, not by any means on account of disease, but because of low-prices. Many planters go in largely for rubber planting, which with coconut cultivation is well suited to large portions of land here. In many cases rubber *Hevea* and coconuts may be seen planted among the coffee, thus ousting the latter as did cinchona and tea in Ceylon. Tea would no doubt grow well here on the higher lands, but evidently the present price of labour would not make its cultivation profitable. The Agricultural labourers are nearly all Tamils imported from India, the natives being quite in the shade and devote their time to fishing, boating and other indolent pursuits. The Chinese, who are employed almost exclusively on the tin mines, form by far the largest portion of the population. Tin-mining is at present the chief source of revenue. I was struck with the excellency of the roads here, which are almost everywhere like cycle tracks. In some places they are metalled with marble, a luxury which not many countries can boast of. The railways are also good, though at present rather disconnected, being in sections which are sometimes separated by lagoons, ravines, etc., over which one has to cross in a boat or otherwise to join a train on the opposite side. In other cases a long gharry ride is necessary from one station to the next. The durian fruit is now in season, and its effluvia seems to pervade everywhere."

PLANTING NOTES.

A FLORAL DISPLAY—of a striking character—is to be seen at present on the very fine specimen of *Alstonia scholaris* in Canella Villa, Turret Road. The tree for height and general appearance is one of the handsomest in Colombo, and its crown and higher sides today have been one mass of greenish-white flowers, highly odoriferous and not at all unpleasant. There ought to be a rich crop of seed after so much blossom. The *Alstonia scholaris* is counted among the rubber-yielding trees; but Trimen does not refer to this. Here is what he says in his "Flora" of Ceylon :—

Lowcountry up to 3,000 ft.; common. Fl. April; greenish-white. In the Eastern Tropics generally. The follicles hang in pendulous clusters, and the whole inflor. falls together. The wood is very light and soft, pale yellowish-white; its principal use is for coffins. The bark is a valuable stringent tonic, much used in fevers; it is an official drug in the Indian Pharmacopœia.

The explanation of the name is as follows :—

Charles Alston was Professor of Botany in Edinburgh University from 1719 till his death in 1760. The *Lignum scholare* of Rumphius, the light wood being used to make 'slates' for school children.

THE THEORY OF MANURING.—Plants required about a dozen chemical elements for their healthy nourishment, but in practice it is only necessary to supply three or four of these in order to make up for the requirements of ordinary crops. The plant food constituents in which soils are most deficient are nitrogen, phosphoric acid, and potash, and it is these which it is the aim of the farmer to supply in such manures as he uses from year to year. The other food constituents required by plants, and including magnesia, lime, iron, chlorine, are usually present in most soils insufficient quantity to supply the requirements of the plants growing therein. It is different, however, with the nitrogen and phosphoric acid and potash. Analysis may show all or some of these to be present in fairly large quantity, but, says the *Farmers' Gazette*, the form or condition in which they exist is such that they are of no practical value to the plant because of the latter's inability to assimilate them. The object of applying manure, therefore, is to supply these constituents in a form in which the plants can soon take advantage of them. The proportion in which these ingredients are required in the soil is, after all, but very small, as is shown by the fact that a ton of farmyard manure supplies only from 9 to 10 or 12 lb. of nitrogen, about the same quantity of potash, and only from 5 to 7 or 8 lb of phosphoric acid.—*Journal of Horticulture.*

SPORT IN B.C.A.

SOME REMINISCENCES OF LEOPARDS IN BRITISH CENTRAL AFRICA.—I.

(*By an ex Ceylon Planter.*)

In 1891 I had the good fortune to possess a donkey who was not much use to me, for I never rode him; so he was allowed to go about the estate at the freedom of his own will, affording much amusement to the na ives who used to watch him braying in solemn silence and awe, till the last note of music ended, when there was a stampede with shouts of laughter from the much amused crowd. One afternoon about three o'clock my cattle keeper turned up with the information that my donkey was found dead at the river, and that no one had gone near the beast for fear of being blamed for causing the death by witchcraft; this sounded strange for it is said a dead donkey is never found.

I proceeded to the spot and found the animal lying amongst the boulders in the bed of the river quite dead and a piece taken out of his flank; some claw marks were visible on the neck, so I concluded it was

THE WORK OF A LEOPARD.

The carcase was quite warm and the fresh foot-prints of a large leopard were visible on the sand. I got some men and beat the bush round about to try and get a shot at the leopard but failed; he had evidently cleared right away upon hearing the sound of human voices.

MY PREVIOUS EXPERIENCE

of leopards led me to know that moving the carcase would not prevent him returning for a feed during the night, and as there was danger of the river rising at any hour and carrying the carcases away, I had it dragged above flood level and soon got to work, setting a spring gun with the string attached in such a way as to cover the approach to the carcase. Two friends who were living with me at the time suggested setting a shot gun loaded with No. 5 shot, as the distance was only five yards, and that it would be more certain to bag our game; so I adopted their suggestion and put a shot-cartridge into the gun instead of a bullet. About 8 p.m., bang went the gun and we then, armed with a double ·577 express and a lantern, set off in great haste to see the result of the shot. After a bit of a search however without success, although there was plenty of blood, we retired, deferring further search till the morrow.

After some early tea, soon after dawn, with half-a-dozen natives, we set off in great glee

EXPECTING A GRAND TROPHY

in the sneaking carnivor who killed my donkey. We found upon examination of the spot plenty of blood, and that the leopard after receiving the full charge of No. 5 shot into his side had made one bound of about 20 feet on to the top of a large flat rock where he had evidently stood for some time, and left a pool of blood behind him. Beyond this not a trace of blood was to be seen. After tracking till 9 o'clock we gave up the pursuit, disappointed and disgusted, offering a reward of 10s to any native who would find our game dead or alive. I had not the slightest notion that the leopard would come back to the carcas, but expected hyenas would and set a rifle covering the quarry, about 10 p.m. Off went the gun again; I decided this time however to wait till day-light to make our search in case of accident and, as events will prove, it is as well be did for it is not a nice thing to find a wounded leopard springing upon a person in the dark.

After the first peep of daylight shone through my window, I was up and called W— and M— and off we set to the scene of slaughter, to find the gun had gone off and

LODGED A BULLET SOMEWHERE IN THE ANIMAL

but there was no sign of him anywhere about, dead or alive.

After an hour's search, we discovered by throwing stones into the bush grass, as we followed the blood tracks, the leopard lying in a flat hollow amongst large boulders and thick scrub, evidently alive, for every time a stone was thrown in, he began to growl. Now to oust him out of his lair, came the job, for see him we could not. I had a dog who had often a narrow escape from leopards, and he stood on the top of a rock (right over where the beast was lying) barking most furiously. I managed with the assistance of a nigger to scramble up to where the dog was and I gave the cur a lift with my foot sending him right into where the leopard was. This had the desired effect, for like lightning he

MADE ONE BOUND AND STOOD WITH THE DOG UNDER HIS FORE-PAWS

with his claws firmly set in the neck and ribs. My gun was at my shoulder in a minute and as I saw the snarling mouth and flashing eyes looking the picture of ferocity, I covered the latter and let drive. He let go his victim and made for me but was unable to ascend the rock as his spine was broken, although his fore quarters were strong. My second barrel was discharged at his head as he endeavoured to climb the rock. It was without much effect, for he turned tail to me and made off back to where I roused him from. Being anxious to secure a good skin, not riddled with bullets, I ceased firing and induced a native, rather bolder than the rest, to get on to a small rock close to where the leopard was lying and pelt him with stones, so that he would either die or give me a shot which would not damage the skin. This had the desired effect, although it took a lot of stones. After a tremendous amount of snarling and growling, out the beast rushed, and made straight for the nigger. Both rolled headlong over the other side of the rock and

DISAPPEARED IN THE LONG GRASS

before I had time even to bring my rifle to the shoulder. As quick as my legs could carry me I was on the top of the flat rock and overlooking my prey on the other side, crouching low; covering the poor boy entirely with his long body; snarling and looking savagely at me on the rock. How to shoot the beast without the bullet going through the native, was my study which seemed impossible from my elevated position, and to descend from the rock would be useless, for I could not see the beast without getting right on the top of him; so my only chance was to fire from where I was and risk damaging the boy. So I let go and sent a bullet through his shoulder and had the satisfaction of seeing the leopard let go his hold and sink quietly down beside his quarry,

DEAD.

Neither the dog nor boy was much mauled, and their wounds were soon healed ; they both doubtless owe their life to the badly wounded and weak condition of the leopard. He proved a full-grown male, measuring 6 ft. 10 in. in length and 2 ft. 7 in. in height, weighing 140 lb.

The following night I set a spring-gun again and shot a hyena, standing 2 ft. 10 in. at the shoulder and weighing 150 lb. Leopards are said not to be scavengers, but this I proved not to be the case, for I have known them, take a bait of dead poisoned fowl, and upon this occasion I set a spring-gun over the carcass of the leopard we had secured, and another one came to have a feed off his probable brother and was shot dead. Although the gun was set for hyenas, we secured another fine specimen of a leopard. I have had

VARIED EXPERIENCE OF THE CEYLON AND AFRICAN LEOPARD

and I am satisfied that the African one is by far the most daring of the two, not hesitating to enter a native hut, but through the roof, lifting its occupant in thedead of night or lifting a watchman from the verandah of a house, even after being fired at.

AN AFTER-DINNER ADVENTURE.

One evening about seven o'clock, just as my cook had dished the dinner in the back verandah leaving no one in the kitchen, my two dogs lying near the fire, raised a fearful howling. Thinking it might be a leopard, and as it was bright moonlight I seized my rifle and ran out just in time to see a leopard carrying away one of my dogs. As he was getting up the bank, I fired and hit him, for he dropped the dog and made off with tremendous bounds before I had time to fire another shot. Upon examining the spoor we found blood tracks for some 500 yards up through the garden, but owing to the want of a good lantern, and knowing the danger of following a wounded leopard at night (even with a good moon) we returned to attend to the mauled dog who was found crouching by the dining room fire, evidently suffering from a severe fright if nothing more, for he would not even answer to his name Chekumba (by the way a name given to him by myself as he was captured and taken prisoner at a war against a slave-raiding chief of that name). Upon examination of the wounds we found two holes, one on each side of the neck, and the skin broken on the top of the head, evidently made by the brute's canine teeth. The wounds, however, did not appear to be serious. Hot water was freely used to wash and cleanse the wounds well, after which strong carbolic oil and wadding was pushed well home in the sores, and Chekumba sent to bed with a bowl of milk beside him. My other dog had evidently a narrow escape too, for he was also lying by the kitchen fire at the time the leopard entered, but how he escaped a mauling no one knows; his voice was however audible enough howling all the way down to the niggers' huts where it seemed impossible to restore him to his natural peace of mind, for he continued barking all night, and never came near the house till daybreak, when he was discovered sneaking into my bed-room with his tail well between his legs. Poor Chekumba next morning began to stagger about with his head down, and at 7 a.m. succumbed to the fatal poison, with a neck swollen to twice the size of his natural one.

ON THE TRACK.

Soon after this we (a party of three), my native overseer, a shikari and myself, set out to track the leopard. From the trail left the beast seemed to be bady wounded, for he was evidenly dragging his tail and hind-quarters on the ground, possibly injured on the spine. Although the African native is not such a good tracker as the Indian shikari, when a white man is behind him with a loaded gun, his natural apathy disappears and the savage can and does track well, notwithstanding his natural inclination to cave in, because he firmly believes that master's gun has got the proper medicine to lay the beast *hors de combat* within 100 yards of the place where he was shot at.

Up to about 11 o'clock, we followed those wearisome footsteps through grass, scrub, and village gardens until the virgin forest was entered and further tracking seemed impossible, and we were just about to return home, wearied and disappointed. After some cold fowl and biscuits and a drink of clear cold icy-water, from the mountain plateau stream, a desperate barking of baboons was heard on some large trees, just behind us, some 300 yards up the valley.

BABOONS.

As the barking of the baboons continued without intermission for about 20 minutes, I asked my men what it all meant, and was told the leopard was the cause of all the row ; and that those fierce members of the monkey tribe always bark when a leopard is in sight, and even go the length of killing their bitter enemy by attacking him in large numbers. This latter part of the yarn, I didn't believe; but the former, I proved beyond a doubt. Off we went to where the noise proceeded from, and found a herd of baboons showing their teeth and making awful faces, bobbing up and down, evidently in a most fearful rage. To stop their row, I fired at the biggest fellow I could see, and brought him down, but off he went as hard as he could scamper, and was out of sight in a minute. I fired at a second and broke his arm ; off he went with his broken limb, dangling in the air, with any quantity of blood spurting down on the leaves of the lower jungle trees. This shooting had the desired effect, and the whole herd made off, leaving us to look after the big fellow who tumbled down. We found him sitting under a huge tree, apparently in the last stage of life, indifferent to all around. In fact, one man ran up to lay hold, but only to find there was still life, and asked me to shoot; I didnt care to do so, if the animal was really dead : but I introduced my gun barrel to his side. Before I could withdraw the weapon, he had it in his teeth and was gripping it like a vice. I pulled the trigger and finished off the monster. To show the powerful canine teeth that a baboon carries, my gun barrel bears the marks (large dents) to this day. After shooting the baboon the second time, and he released my gun, I stood away a little distance and was thunder-struck to see the beast take the blood from his bleeding side with his hand, look at it, and then at me, as much as to say, "You have murdered me," and then expired. I vowed in my own mind, that I would never shoot another baboon, and I have not done so to this day, although I have had many opportunities since. Upon resuming our search for the leopard, I found close by a small cave, where he had evidently lain all night, for there were splotches of blood on the dry ground, but beyond the cave, no trace could be seen. The baboons again began to bark some distance up the hill and we made

tracks in that direction. This time, however, I determined not to fire a shot at the monkeys, but reserved it for better sport. We soon discovered the leopard who seemingly saw us coming, and was skulking away looking over his shoulder at us, but turn round; he would not or give me a decent shot. On the beast went very stiff apparently, with his hind quarters now and again giving way under him. Another rock cave came in sight, and we lost sight of our game for a minute, till we got pretty close up to the entrance.

DONE FOR.

My courage at this instant seemed to fail me, for I stopped dead to think for a minute what I was about. Gaining my presence of mind, I looked back for my tracker with my spare gun, and was not a little surprised to find I was alone. All was quiet and still as night in the dense forest; the baboons even had stopped their hideous noise. I grasped my rifle firmly although my legs were a little shaky. Just at this time, I heard the crackle of dead twigs behind me, which made my heart thump against my side, at a furious rate. Upon looking round I found to my surprise and no little delight my men with the spare gun.

A dozen or more paces forward brought us in full view of a handsome leopard lying on the ground, patiently waiting our approach at the mouth of the cave, just in the same attitude as a cat assumes when watching a rat, before the final spring. The position was a bad one, as I was below the level of the animal, but to go nearer was too risky, for I was only twenty paces or less away; so no time was to be lost, and I fired, aiming right between the eyes. No sooner had my bullet been felt by the brute then he bounded out of his lair right towards us, giving me no time for a second shot. The niggers were gone like a flash of lightning in one direction and in another. I pulled up after reaching the nearest tree and looked round to see if I couldn't get a second shot, and saw my tracker aiming at the leopard about ten yards behind me; the beast had pulled up, whether from exhaustion or funk at being between two guns I don't know; but he had the contents of both my trackers' and my gun simultaneously and rolled over down the hill between us, now and again giving a bound in the air till all signs of life had gone. When we got up to the carcase I found my yesterday's bullet had gone right through his back close to the spine. My shot in the cave had torn a piece out of the side of his head, and my last bullet and my tracker's had both gone clean through his lungs. The overseer was despatched to bring men to carry home our quarry. I was soon at the bungalow, and after a bath and a change, was as fresh as a daisy. The baboons were not heard again that day, although many a time both night and day, too, afterwards I was tempted to go out in search of leopards, presuming that I would get some sport. I never again succeeded in seeing a leopard being bayed by baboons again. I found on one occasion, however, the hind quarters of a baboon that had fallen a prey to a leopard who had just left it on my arrival.

LEOPARDS AND TRAPS.

Leopards are very cunning, and dubious about going into a trap. I have frequently had a trap built of logs with a bait of a goat or dog in it, but never induced one to go in, although they have often enough walked round about the trap. On one occasion I had a dog put in the trap every night for about a month as a bait for a leopard, and the beast often enough walked round about the house and had a look at the dog. One night, however, the leopard, very hungry evidently, began by biting and clawing at the far end of the trap (although the trap door was open he would not enter and be caught) until he managed to introduce his forearm, and frightened the dog, so as to force him to make a most desperate effort to escape—till he did manage it, and came home in the middle of the night in a terrible state. Upon my examination of the surroundings next morning I found the leopard had hunted the poor cur at full speed from the trap to my very door, about half a mile.

The African leopard is not destructive to cattle establishments and I have never heard of one entering a cattle kraal, although often enough a stray calf has fallen a prey to their cunning in the bush without even the herd boy's knowledge. Goats and pigs' houses are often entered by leopards, as also native huts, and the occupants carried away for a midnight meal. When hungry the leopard will eat almost anything, even to mulberries on a road-side, till he nearly dies from diarrhœa. This fact once came under my personal observation with an old leopard of mine.

A TROUBLESOME BEAST.

I was very much troubled by a most daring leopard who baffled all my attempts to capture or destroy by any means in my power. He was always about the neighbourhood, catching stray fowls in the forest, or on the estate round about the buildings, or in the surrounding villages. My dogs also became a prey to this determined robber. Fowls accustomed to be hunted by a leopard are grand watchmen, and make the most awful row you ever heard when their enemy arrives in the vicinity at night, rousing a whole household. One night about 1 o'clock, my fowls made such a row that I thought the leopard had got in amongst them. I seized my Lee-Metford, and a lantern and made tracks for my fowl-house, my dog Dan leading the way, making a rush through the garden gate in front of me. I found upon reaching the fowl-house that all my servants had congregated ready for any sport that might turn up; but, alas, to our disappointment, after a thorough search, no leopard was to be found. Neither was my dog Dan; call as we might, he didn't turn up; so I went off to bed, much disappointed and disgusted. Next morning the dog was nowhere to be found and upon examination of the premises, I discovered that he had been caught and carried away by the leopard just outside the garden gate. We followed the track into the neighbouring forest for about half-a-mile and came upon half my poor dog's carcase, but no leopard could be seen anywhere; so the only thing left for us to do was, after considerable search, to retire and leave him his tit-bit, well primed with arsenic, in case he should return to finish the remainder of his meal during the night. Next morning at dawn all were astir, and trackers with flint-locks and myself with a double ·577 express set off in great haste, each one more eager than the other to get a close view of our troublesome robber. Upon reaching the remains of the dog, we found all the remains were finished except a foot. Silence and diligent search was made all round the spot till we found that the arsenic had taken effect: about 100 yards off. Vomiting of dog meat, and much rolling about, was evidence of the arsenic causing much pain and trouble in several places, but the leopard was no-

where to be seen, and it was evident he got away after discharging the contents of his stomach, the dose of poison having been too much. He lived to give us some more annoyance as the following yarn will show. [Strychnine is a much safer poison than arsenic to administer to an animal as they never vomit it.]

FEEDING ON FOWLS.

My fowl-house being well built with strong logs of timber,—in fact a regular American log house that no animal could get through, was a puzzle to Master Spots for many a day when he was on his midnight rounds. His footprints bore evidence of his having many a look through at the Kukus fowls, he was so anxious to reach, but could not. Although many a stray fowl sitting on eggs, as was their wont, fell to his lot in the surrounding bush, he seemed to fail to enter the house where the herd of hundreds were visible.

One night, after everybody had retired to rest, a fearful racket got up amongst the fowls, each one trying to croak louder than another, like so many huge frogs at work. All the household were soon on the move, and tracks made to the house to see what was the matter, all making sure the leopard was apparently killing Kukus by the dozen inside. Upon mustering at the door, cook, house-boys and everybody else were very brave, but to go inside and shoot the leopard was more than their feelings would stand ; so the door was most carefully opened a bit, and the lantern introduced to see what could be seen. I, holding my rifle half in at the door, expecting a charge every minute, determined to do for the beast. I was much disappointed to find a hole in the thatched roof with the moonlight shining in on the floor, where the leopard had evidently gone in by, for a lunch, sneaked a Kuku or two and evidently made his exit at the same hole, for search in every nook and corner failed to find him. Upon searching outside we discovered footprints quite deep in the earth where he had jumped off the roof with his prey.

ON THE WATCH.

Judging that one or even two fowls, which was as many as could be carried away at that time, would not suffice for a meal but quite enough to prepare an appetite for a substantial meal, I offered a reward of 5s to anyone who would sit up and watch for the leopard, and shoot him, as I felt sure he would return later on in the night. My cook and another domestic volunteered to sit in the adjoining room, partitioned off from the fowl-house. The dividing wall only being six feet high the leopard could be seen and shot when entering his hole in the roof without much danger of a personal attack upon the watchers who considered themselves pretty safe and were quite jubilant at the prospect of being considered by all the neighbouring people brave, lion-hearted men who were brave and courageous enough to shoot a leopard which had a reputation not only for killing domestic animals but human beings also; for it was known to have the daring to carry away a boy and kill and eat him in broad daylight.

About 9 30 p.m., just as all the household were retiring for the night, the shot of a rifle was heard and out everybody bolted to see the result. Upon interviewing the watchmen and examining the hole in the roof and outside of the shed for some distance around we concluded that Somewa, the cook, had missed; for there was neither blood nor leopard to be seen anywhere about. How the watcher could have missed the animal (who according to his own story, was half through the hole in the roof when he fired) seemed a mystery to all. The leopard, however, left marks of his having been there beyond a doubt.

WANTING TO CATCH MEN.

All the household had gone to rest again and were sound in the arms of Nod, when all were roused at 12·30 a.m. by the loud report of a gun, the hoarse growling of the leopard and the yelling of men, as if a fierce battle was raging between man and beast. I could hear distinctly "Mpalugwe afmia cughura enza,"—"leopard wants to catch men." Of course, no time was lost in seizing my rifle and hastening to the spot to find no one any the worse of the scare. So I may as well tell my readers in my cook's own words what actually transpired.

We were dosing, but not actually asleep when my companion roused me up with a nudge on the side with his fist ; and upon looking up, I saw the leopard's head and neck through the hole in the roof. (Not a Kuku was on the "prareh" for him to seize, for they had been all knocked down on to the floor during the previous attack and were as quiet as mice, not being able to smell the leopard in his elevated position.) I let him get in his fore-arm and fired. No sooner had I done so than he made a dive through the hole on to the fowl rack, and one spring right into the room where we were lighting in the middle and just as he reached the ground, my friend and I plunged through the door, both leopard and ourselves, howling our very hardest ; both of us fell heels overhead outside the door, and to the right of it the leopard followed like lightning, but fortunately for us turned to the left and left us alive, and—well, this is all I know!

I examined my men who were more frightened than hurt, and found some spots of blood on one of their cloths and on the side of the door some leopard's hair and blood, evidence of the beast being severely wounded ; but how the nigger escaped without a scratch seemed to me a mystery. Well, upon following up blood marks on the ground, we found that the brute had gone right through a well-secured double bango end fence across our tennis ground, and through the fence on the other side, leaving ample evidence, in bloodstains and hair, on the fence to show that he was mortally wounded. A little further on about 100 yards, in all, from the fowl house, groaning was heard, and my dogs began to bark furiously. I knew by this time, if the leopard had strength enough left in him, he would go for the dogs, so we got torches of dry grass and approached the spot where the groans were heard, to find the beast lying on his side, breathing hard, but making no effort to move. He gave one or two kicks and my rifle was up to shoot. But I didn't—he was dead in a second, and I was not called upon to spoil the skin with more bullet holes.

I have not related half the depredations of this scourge of a leopard, for fear of wearying my readers, but suffice it to say that he was the most daring, impudent beast I have ever heard of and my reward was paid, and my cook who shot the brute was never afterwards called chicken-hearted. My readers may be surprised that I had not courage enough to sit up for the animal myself. My reason for not doing so was because my wife was ill with a severe attack of pleurisy, and it would not be right for me to do so under the circumstances. It would not be the first leopard I sat up for and shot however.

The daring of the beast to return a couple of hours after having been fired at within 10 paces, seems incredible.—H. B.

HOW TO DEAL WITH "TEA" NOT FITTED FOR EXPORTATION?

We are reminded by an upcountry correspondent that when rinderpest was bad in Scotland (and we suppose in England) a fund was formed, whereby the owners of any cattle that had to be slaughtered, were indemnified for their loss. The question is, can the principle be adopted and a fund formed to deal with teas which ought not to be exported from this island to the detriment of the good name of Ceylon teas and to the injury of the London market? Naturally, and equitably, the money to form such a fund should come out of the Tea Cess; but for the present all the available collection has been voted away. Nevertheless, if any feasible scheme were formulated for buying up what are talked of here as "rubbishy" teas—all produce sold below a certain fixed limit and thereby considered to be unsuited for exportation—we cannot believe that the Government would make much difficulty in allowing the Cess collection to be forestalled in order to deal with an emergency like that which has been disturbing the Tea Market lately. At the same time, it is possible such a lesson has already been taught and learned that the crisis may be said to be over, and that a continuance of 10 cents-a-lb. teas is not to be feared in the local market. We should like to be assured of such produce and prices being things of the past. But wise men should act against the risk of recurrence, and in order to prevent any possible chance of the further exportation to London, Australia, America—in fact, to any of our customers—of anything like 10 cents-a lb. tea. The parallel of "rinderpest" would point to the destruction of the condemned tea; but might it not be dealt with chemically to some useful purpose for the extraction of the tannin and perhaps of a useful dye? If this could not be done in Ceylon, some precaution would have to be taken to ensure that only for chemical (and not for food) purposes was such tea sent out of the island.

PRODUCE AND PLANTING.

TEA AND COFFEE.—Some interesting and suggestive facts are contained in the Board of Trade report on tea and coffee just published. The English people and peoples of English descent are still the greatest consumers of tea among the Western nations. The average consumption of the home-staying Englishman is six pounds a year, while the Australian colonist consumes as much as seven and a half pounds. Why the fragrant leaf is less popular in the United States it is not easy to say. The Americans and the Russians are conservative in their taste, and continue to prefer China tea, but the work of pushing British-grown tea goes on steadily. The tea consumed in England is nearly all grown in India and Ceylon. The production of coffee, like that of tea, is largely increasing, and may be said, speaking generally, to have doubled in the last ten years. The chief producing countries are all in America, Mexico being the most northern and Paraquay the most southern of the countries of that continent where coffee is produced. The chief countries of production, in the order named, are Brazil, Venezuela, the United States of Colombia, Mexico, Costa Rica, Guatemala, and Hayti. The United States holds a very similar place in the coffee trade to that held by the United Kngdom in the tea trade, the relative consumption in each case exceeding that of all the other countries of the civilised world put together. The coffee trade of the United States, therefore, may be said to virtually control the trade, as well as to a certain extent the prices, of coffee throughout the world.

FIJI AND ITS PRODUCE.—A paper on "The Islands and the People of Fiji" was read before the Royal Colonial Institute on Tuesday by Mr. Morgan L. Finucane, Provincial Inspector of the Provinces of Tarlever and Ra, and medical officer of the colony. Referring to the industries of the colony, Mr. Finucane pointed out that the wealth and future prosperity of the colony undoubtedly depend on the output of sugar, and it has been shown that in the Fiji Islands sugar-cane is capable of high cultivation and growth in nearly every district with profit to the cultivator in spite of the falling prices in raw sugar. The sugar industry is entirely in the hands of the wealthy Colonial Sugar Refining Company, who possess practically the monopoly for the supply of sugar in the whole of Australasia, and are even now sending Fijian grown sugar into Canada. The system adopted is that of local planters—European, Indian, and Fijian—cultivating areas of cane land and selling the product to the central mills of the company; proper cultivation of the land is brought about by the terms in the company's contracts with growers by which they are paid, not in accordance with the quantity of cane grown and delivered to the mills, but on the percentage of raw sugar obtained by analysis of the cane supplied with a sliding scale. Coffee grows well in Fiji, both the Liberian and Arabian varieties, and does best in shaded mountainous districts, such as are found in the upper reaches of the Wai-ni-Buka in Viti Levu; large areas have been put in by the Fijians as an addition in future years for the payment of their taxes and self-betterment. Vanilla grows well, and has realised good prices in the open market. Tobacco, ramie fibre, cocoa, cinchona, tea, and india-rubber are all to be found in Fiji. Tea does exceedingly well, and has a delicious flavour, says Mr. Finucane: There were, when I went to the colony, two flourishing estates with a perfect soil and altitude for the growth of this beverage: at present the local consumption of the product is entirely drawn from the group, and it is also exported to New Zealand and Australia.

ABYSSINIAN COFFEE.—A Consular report from Harrar says: "The Harrari coffee is of a very good quality, known in the London market as 'Moka long berry,' where it is preferred to the real Moka. Occasionally its price in London is higher than that of Moka. Plantations of coffee are increasing slowly, because the natives prefer to cultivate the Kiatt (Celastrus edulis) as more lucrative, 1 lb. of leaves of which are sold for 1 dol., and sometimes 2 dol.; the natives, as in Arabia, are eating these leaves. Nevetheless, more than 150,000 coffee trees have recently been planted, especially in the districts of Chercher and Itto."—*H. and C. Mail*, Nov. 30.

SPORT IN BRITISH CENTRAL AFRICA.—The second letter of the interesting series of letters we have been publishing on leopard-shooting in B.C.A. appears on page 501. The sport appears to be full of variety, the article describing the despatch of a leopard that raided a fowl-house through the roof and made its exit by the same route! We look forward to further "experiences" from "H.B," whose adopted country evidently abounds in sport of a hazardous nature.

FROM A FRENCH HORTICULTURIST.

TO THE EDITOR OF THE "INDIA RUBBER WORLD."

I have read in your instructive journal several times references to the extraction of rubber by pressure from young Calisaya elastica plants. I do not know what this means. I have twice sent one of my agents to America for the purpose of studying the extraction of rubber from the leaves of plants, but gained little information thereby. I believe that this is something to be developed in the remote future, if ever.

But the extraction of rubber from the barks of trees I consider more practicable. I have been successful, it is true, with one American species, Hancornia speciosa, or "Mangabeira" rubber, which is the easiest of all sorts to try by my process. Its bark is very friable, like sugar so that it is easily disintegrated. Ficus sorts from the Guianas give rubber, but in small quantity. How many species there may be that I have overlooked I am unable to say. But, curious to say, I could do nothing with Hevea or Castilloa, though these are precisely the species in which my agent was interested.

Forsteronia gracilis, of British Guiana, is a member of the same family as Landolphia, Vahea, Urceola, etc., which proves its richness in rubber, and it should be susceptitble to treatment of the bark for rubber. What a beautiful climber, by the way, is this Forsteronia! My agent brought home only stems without any roots, but after six weeks I had stems two and half yards high.

Success ought to be attained in tropical America with the Landolphia Hendelotii, which thrives in a sandy soil as well as loam, and yields a good rubber. Landolphia Owariensis, L. Klanei, and L. Kirkii, want more water and shade. These and various other creepers or climbers producing rubber ought to be grown in America with more profit than anywhere else, as experience will prove. They are easily propagated by cuttings and be utilised for rubber far earlier than any American species.

Can you tell me what is the plant from southern California, yielding a good rubber from stems which can be cut yearly like asparagus? I have several stems, which look like Euphorbia, but I believe these are composite.

A. GODEFROY-LEBEUF.

Establissement d'Horticulture, Paris, Sept. 13, 1900.

LAGERSTRŒMIA INDICA.—Among the many tropical and subtropical plants which are said to make a very fine display in their native places many prove disappointing when grown under glass in this country. This, however, cannot be laid to the charge of the plant under notice, for it is said to flower quite as well here as in India, where it is one of the most favoured garden shrubs. To grow it well it should be planted in an intermediate house in loam, given a sunny position, and dried off in winter. On the approach of spring all the previous year's wood should be shortened to get good strong young shoots. If a lot of growths are made, all the weak ones should be removed when a few inches long, by which means the inflorescences will be greatly improved. Flowering will commence about the end of July, every shoot being terminated with large panicles of pretty fringed blossoms. The flowers of the typical plant are pink, but variation may be had by growing the purple, deep red, and white varieties. It can be readily rooted from cuttings of half-ripe wood, and can be grown and flowered as a pot plant. If grown in the latter way it must be well fed and thinned to encourage strong shoots,—D,—*Journal of Horticulture.*

SHARE LIST,

(Not made up during Holidays.)

THE LOCAL MARKET.

(By Mr. James Gibson, Baillie St., Fort.)
Colombo, Jany. 8th, 1901.

COFFEE :—	
Estate Parchment per bushel	None
Chetty do do	Nil.
Native Coffee } per cwt.	Nil.
do F. O. B } per cwt.	Nil.
Liberian coffee:—per bushel	Nil.
do cleaned coffee:—per cwt	Nil.
Cocoa unpicked:—per cwt	R41·00 to 44·00
do cleaned do	R44·00 to 52·00
Cardamoms Malabar per lb	R1·20 to 1·30
do Mysore do	R1·70 to 2·00
RICE :—	
Soolai per bag of 164 lb. nett	R9·15 to 9·27
1st quality:—per bushel	R3·50 to 3·55
Soolai 2 & 3rd. do do	R3·38 to 3·48
Coast Calunda	none available.
Coast Kara	R3·90 to 4·00
Kazala	R3·30 to 3·35
Muttusamba Ordinary	R5·75 to 6·00
Cinnamon per lb No 1 to 4	00·53 to 00 54
do do 1 and 2	00·61 to 00 62
do Chips per candy	R90·00 to 92·50
Coconuts Ordinary per thousand	R35·00 to 38·00
do Selected do	R36·00 to 39·00
Coconut Oil per cwt	R14·12½ to 14·50
do do F. O B. per ton	R282·50 to 290·00 nominal.
POONAC :—	
Gingelly per ton	R100·00
Coconut Chekku do	R90 00
do Mill (retail) do	R85·00
Cotton Seed per ton	R80·00
Copra per candy	
Kalpitiya do	R45·50 to 46 75
Marawilla do (Boat)	R44·00 to 46·50
Cart Copra do	R36·00 to 44·00
Satinwood per cubic feet.	R2 00 to 2·25
do Flowered do	R5·00 to 6·00
Halmilla do	R1·90
Palu do	R1·00 to 1·12
Ebony per ton	R75·00 to 175·00
Kitul fibre per cwt	R30·00 to 32·00
Palmyra do do	R6·00 to 14·00
Jaffna Black Cleaned per cwt	R13·00 to 14·00
do mixed do	R11·00 to 2·00
Indian do	R6·00 to 12·00
do Cleaned do	R8·00 to 12·00
Sapanwood per ton	R45·00 to 47·50
Kerosene oil American per cases,	R7·00 to 7·25
do bulk Russian, per tin	R3·12 to 3·15
do Russian per cases	R6·30 to 6·40
Nux Vomica per cwt	R2·00 to 6·50
Croton Seed per cwt	R20·00 to 22·00
Kapok cleaned f o b per cwt	R24·00
do uncleaned do	R5·50
Plumbago per ton, according to grade — Large lumps	R400·00 to 650·00
Ordinary size lumps	R200·00 to 600·00
Chips	R125·00 to 400·00
Dust	R75·00 to 225·00

RAINFALL RETURN FOR COLOMBO.

(*Supplied by the Surveyor-General.*)

	1896.	1897.	1898.	1899.	Av of 30yrs.	1900	1901
	Inch	Inch	Inch	Inch.	Inch.	Inch.	Inch.
January ..	2·92	3·81	2·32	6·98	3·22	3·72	4·42*
February ..	0·35	1·68	1·98	2·78	1·93	0·63	
March ..	5·64	3·66	4·21	0·88	4·78	3·71	
April ..	5·93	10·97	22·81	6·66	11·31	15·12	
May ..	9·31	8·30	5·80	17·73	12·09	10·63	
June ..	8·37	10·14	10·94	9·23	8·37	7·83	
July	2·85	5·24	6·15	1·11	4·38	6·77	
August ..	6·35	9·09	0·97	0·62	3·67	7·35	
September	10·99	4·58	6·90	1·48	5·01	4·00	
October ..	16·78	4·71	20·60	12 99	14·52	9·47	
November..	19.81	11·66	17·38	8·58	12·66	9·25	
December..	11·76	8·89	3-05	4·44	6·39	5·20	
Total..	101·06	82·73	103·11	73·48	88·33	83·68	4·42*

* From 1st to 8th Jan. 4·42 inches, that is up to 9·30 a.m. on the 8th Jan.—ED. *C.O.*]

Ceylon Rainfall.

The P. W. D. Meteorological Observations for Nov 1900.—We append the Monthly Return of rain from which it will be seen that the highest fall in Nov. was at Pallai in the Northern Province 32·90 inches, and the lowest at Tangalla in the Southern Province, 2·07 inches.

Western Province

Negombo, Mr. Bucknall (6) ... 11·15
Kalutara Mr. Emerson (36) .. 11·06
Labugama, Mr. Bond (369) ... 13·75
Henaratgoda, Mr. Silva (33) .. 15·92

Central Province.

Katugastota, Mr. Morgan (1,500) ... 17·90
New Valley. (Dikoya) Mr. Waddell (3,700) .. 18·71
Helboda (Pussellawa) Mr. Gosset (3,300) .. 20·21
Yarrow Estate. .. Mr. Padwick (3,400) 20·51
Peradeniya Not received (1,540) ... —
Duckwari, Mr. Edwin (3,300) ... 13·00
Caledonia, Not received (4,273) .. —
Pussellawa, do (3,000) .. —
Hakgala, Mr. .. Nock (5,581) ... 16·14
S. Wanarajah Estate, Mr. Tatham (3,700) .. 15·53
Padupola, Mr. Waddel (1,636) ... 11·78
Mylapitiya, Mr. Fletcher (1,707) ... 2·48
Aluta Mr. Daly Winter .. .. 14·78

Northern Province.

Mullaittivu, Mr. Ebert (12) .. 12·63
Jaffna Mr. Macdonnel (8) 18·06
Maukulam, (N. Road) Not received (167) ... —
Elephant Pass, Mr .. Silva (7) .. 15·23
Vangalachettykulam, Mr. Oorloff (179) .. 5·20
Point Pedro Mr. Chitampalam (24) ... 11·51
Jaffna College, Mr. Hastings (9) ... 20·58
Kayts, Mr. Kretser (8) .. 18·77
Kankesanturai, Mr. Pararachasinghe (10) .. 19·14
Pallai, Mr. Silva (24) .. 32·90
Murlkandy, (North-Central Road) Mr. Silva (7) 22·56
Nedunkeni, Mr. Ebert (122) ... 25·20
Chavakachcheri, Mr. Silva (16) ... 20·08
Udupiddi, Mr. Brown (35) .. 14·15
Marichchukaddi, Mr. Tampue (14) 6·44
Murungan, Mr. Walker (52) 11·95
Vavunlya Mr. Ebert (318) 10·01

Southern Province.

Ella Vella Mr. Caldicott (262) 13·46
Kekanadura, do (150) 3·70
Denagama, do (286) 8·24
Udukiriwila Mr. Lourensz (235) .. 6·16
Kirama, Mr. Lorensz (260) 9·40
Hali-ela Mr. Caldicott (200) 11·25
Tissa Mr. Silva (75) 11·83
Matara Mr. Caldicott (15) .. 13·80
Dandeniya, do (157) 12·1
Urubokka, Mr. Caldicott (890) 26·49
Tangalla Mr. Russell (94) 2·07
Mamadola, Mr. Doole (56) .. 9·24

Eastern Province.

Irrakkamam, Mr. Bower (42) ... 15·44
Devilana, Mr. Vanderstraaten (136) 14·60
Sagamata, Mr. Bower (40) ... 16·49
Ambare, do (65) 19·58
Kanthalai, Mr. Carte (150) 5·28
Allai, Mr. Carte (95) 21·28
Rukam, Mr. Vanderstraten (120) ... 13·80
Periyakulam, Mr. Carte (20) ... 21·48
Chadaiyantalawa, Mr. Goodman (57) 22·63
Kalmunai, do (12) 17·63
Rotewewa, Mr Bower (30) 13·58
Lahugala, do (70) 8·46
Naulla, do (30) 8·98
Andankulam, Mr. Carte (41) ... 22·27
Manalpuddy, Mr. Vanderstraaten (21) 26·70
Maha-Oya-Tank, Mr. Vanderstraaten (190) 19·88
Potuvil, Mr Sinnayah (10) 12·51
Vakaneri Mr. Watts, (8) .. 13·51

N.-W. Province.

Magalawewa, Mr. Crabb (176) .. 6·14
Maha Uswewa tank, Mr. Adams (160) ... 2·45
Tenepitiya, Mr. Churchill (8) ... 8·75
Batalagoda, Mr. Madahapola — 10·88

N.-C. Province.

Kalawewa, Mr. Chellappah (268) 12·59
Maradankadawala, Mr. Emerson (443) ... 5·99
Mihintale, Mr. MacBride (354) .. 6·50
Horowapotana, Mr. MacBride (217) .. 14·80
Madawachchiya, Not received (285) .. —
Topare, Mr. Jayewardane (200) .. 16·06
Minneriya Mr. Eves —13·98

Uva Province.

Bandarawela, Mr. Tocke (4,000) 18·60
Haldummulla, Mr. Viramuttoo (3,160) 31·85
Kumbukan, Not received (446) —
Koslanda, Mr. Edge (2,258) ... 23·32
Tanamalwila, Not received (550) .. —
Bibile, Mr. Silva (680) 16·94
Taldena, Mr. Fernando (1,100) .. 18·06
Alutnuwara—Mr. Leembruggen (300) 15·86

Sabaragamuwa.

Ambanpitiya, Mr. Gregson (729) 19·61
Pelmadulla, Mr. Bingham (480) 17·68
Kolonna Korale (Hulanda-oya) Not received (203) —
Avisawella, Mr. Clarke (105 .. 12·21

COLOMBO PRICE CURRENT.

(Furnished by the Chamber of Commerce.)

EXPORTS.

Colombo, 31st Dec. 1900.

Cardamoms:—
All round parcel, well bleached per lb. R1·90
Do. dull medium do. 1·50
Special assortment, 0 and 1 only do. 2·25
Seeds do. 1·40

Cinchona Bark:—
Per unit of Sulphate of Quinine 9c—For 1½ to 3 o/o.

Cinnamon:—
Ordinary assortment per lb. 57c.
Nos. 1 and 2 only per lb. 62c.
Nos. 3 and 4 only per lb. 54c.

Cinnamon Chips:—
Per candy of 560 lb R92·50

Cocoa:—
Finest estate red; unpicked per cwt R58
Medium do do R54
Bright native, unpicked and undried R52
Ordinary do do do R44

Coconuts—(husked).
Selected per thousand R50·00
Ordinary „ R39·00
Smalls „ R30·00

Coconut Cake—
Poonac in robins f. o. b. per ton R78·75
Do in bags None

Coconut (Desiccated).
Assorted all grades per lb 14½c

Coconut Oil—
Dealers' Oil per cwt R14·50
Coconut Oil in ordinary packages f. o. b. per ton R325·00.—Nominal.

Coffee.—
Plantation Estate Parchment on the spot per bus. R8·50
Plantation Estate Coffee f.o.b. (ready) per cwt - None.
Native Coffee, f.o.b per cwt.—None.

Citronella Oil—
Ready do per lb. 65c.

Copra—

Boat Copra	per candy of 560 lb.			R46·50
Calpentyn Copra	do	do	do	R46·75
Cart	do	do	do	R42·00
Estate	do	do	do	R46·75

Croton Seed per cwt None

Ebony—
Sound per ton at Govt. depot—R230.
Inferior R155. Govt. sales of 3rd December.

Fibres—

Coconut Bristle	No. 1	per cwt	R10·50
Do	„ 2	„	None
Do mattress	„ 1	„	4·00
Do	„ 2	„	3·00
Coir Yarn, Kogalla	„ 1 to 8		18·00
Do Colombo	„ 1 to 8		16·00
Kitool all sizes		„	None
Palmyrah		„	None

Pepper—Black per lb None

Plumbago—

Large lumps	per ton	R650	Market dull.
Ordinary lumps	do	600	
Chips	do	400	
Dust	do	225	
Do (Flying)		125	

Sapanwood— per ton None

Satinwood (ordinary) per cubic ft. R7.50; Slightly flowered—Govt. sales of 3rd December.
Do per cubic ft. R19·50; Well flowered—Govt. sales of 3rd December.

Tea—	High Grown Average.	Medium Average.	Low Grown Average.
Broken Pekoe and Broken	cts	cts	cts
Orange Pekoe per lb	52	39	28
Orange Pekoe do	55	36	29
Pekoe do	45	32	24
Pekoe Souchong do	32	27	18
Pekoe Fannings do	25	20	14
Broken mixed—dust, &c per lb	21	16	16

MARKET RATES FOR OLD AND NEW PRODUTS

(From Lewis & Peat's Fortnightly Prices Current, London, December 19th, 1900.

	QUALITY.	QUOTATIONS.
ALOES, Soccotrine cwt.	Fair to fine dry ...	44s a 85s
Zanzibar & Hepatic ,,	Common to good ..	20s a 60s
ARROWROOT (Natal) lb.	Fair to fine ..	5½d a 6¼d
BEES' WAX, cwt,		
Zanzibar & White ,,	Good to fine	£6 a £7 10s
Bombay Yellow ,,	Fair ,,	£6 5s a £6 15s
Madagascar ,,	Dark to good palish	£6 a £6 10s
CAMPHOR, China ,,	Fair average quality	182s 6d
Japan ,,	,, ,, ,,	192s 6d
CARDAMOMS, Malabar lb	Clipped, bold, bright, fine	2s 3d a 2s 4d
	Middling, stalky & lean	1s 5d a 1s 7d
Ceylon.—Mysore ,,	Fair to fine plump ..	1s 6d a 4s 3d
	Seeds .	2s 6d a 2s 8d
,, Telli cherry,,	Good to fine ..	2s 11d a 3s
	Brownish ..	2s 6d
,, Long ,,	Shelly to good ..	2s 11d a 3s 6d
,, Mangalore,,	Med brown to good bold	25d a 3s 4d
CASTOR OIL, Calcutta ,,	1sts and 2nds ..	4d a 4½d
CHILLIES, Zanzibar cwt.	Dull to fine bright ...	35s a 46s
CINCHONA BARK.—lb. Ceylon	Ledgeriana Orig. Stem	3¾d a 6¾d
	Crown, Renewed	5d a 7d
	Org. Stem	3¾d a 5½d
	Red Org. Stem	4⅜d a 5⅜d
	Renewed	5¾d a 7½d
	Root	3¾d a 4d
CINNAMON, Ceylon 1sts per lb.	Ordinary to fine quill	11d a 1s 8d
2nds	,, ,,	10d a 1s 6d
3rds	,, ,,	9½d a 1s 6d
4ths	,, ,,	8½d a 11½d
Chips	,, ,,	3½d a 6d
CLOVES, Penang lb.	Dull to fine bright bold	6d a 9d
Amboyna ..	Dull to fine	4½d a 5½d
Zanzibar and Pemba	Good and fine bright	4d a 4½d
	Common dull to fair	4d a 4⅝ 6d
Stems ..	Fair	1⅝d
COFFEE Ceylon Plantation ,,	Bold to fine bold colory	100s a 110s
	Middling to fine mid ..	85s a 97s 6d
	Low mid. and low grown	75s a 82s 6d
	Smalls	55s a 75s
Native	Good ordinary	30s a 70s
Liberian ,,	Small to bold	36s a 42s 6d
COCOA, Ceylon ,,	Bold to fine bold	90s a 100s
	Medium and fair	80s a 87s
	Native	63s a 72s 6d
COLOMBO ROOT ,,	Middling to good	12s a 20s
COIR ROPE, Ceylon ton		nominal
Cochin ,,	Ordinary to fair ..	£13 10s a £18
FIBRE, Brush ,,	Ord. to fine long straight	£16 a £19
Cochin ,,	Ordinary to good clean	£ 0 a £29
Stuffing ,,	Common to fine	£7 a £9
COIR YARN, Ceylon ,,	Common to superior	£15 a £33
Cochin ,,	,, ,, very fine	£12 a £32
do. ,,	Roping, fair to good	£10 a £14 10s
CROTON SEEDS, sift. cwt.	Dull to fair	30s a 40s
CUTCH ,, ,,	Fair to fine dry	23s a 35s
GINGER, Bengal, rough ,,	Fair	3[illegible]s
Calicut, Cut A ,,	Good to fine bold	80s a 100s
B & C ,,	Small and medium	33s a 77s 6d
Cochin Rough ,,	Common to fine bold	28s a 34s
	Small and D's	26s a 30s
Japan ,,	Unsplit	28s a 30s
GUM AMMONIACUM ,,	Sm. blocky to fine clean	20s a 45s
ANIMI, Zanzibar ,,	Picked fine pale in sorts	£10 7s 6d a £20
	Part yellow and mixed	£8 2/6 a £10 10s
	Bean and Pea size ditto	70s a £9 2/6
	Amber and dk. red bold	£5 10s a £7 10s
	Med. & bold glassy sorts	80s a 100s
Madagascar ,,	Fair to good palish ...	£4 8s a £8
	,, ,, red ..	£4 5s a £9
ARABIC E. I. & Aden ,,	Ordinary to good pale	35s a 60s
Turkey sorts ,,		65s a 80s
Ghatti ,,	Pickings to fine pale ...	12s 6d a 35s
Kurrachee ,,	Good and fine pale	52s 6d a 55s
	Reddish to pale selected	30s a 40s
Madras ,,	Dark to fine pale ..	23s a 35s
ASSAFŒTIDA ,,	Clean fr. to gd. almonds	40s a 85s
	Ord. stony and blocky	6s a 25s
KINO ,,	Fine bright	1s a 1s 3d
MYRRH, picked ,,	Fair to fine pale	90s a 107s 6d
Aden sorts ,,	Middling to good	50s a 60s
OLIBANUM, drop ,,	Good to fine white	35s 6d a 50s
	Middling to fair	25s a 35s
pickings ,,	Low to good pale	17s a 20s
siftings ,,	Slightly foul to fine	16s 6d a 18s
INDIARUBBER, Assam lb	Good to fine	2s 10½d a 3s 0½d
	Common to foul & mxd.	1s 4d a 2s 6d
Rangoon	Fair to good clean ...	2s 3d a 3s 3d
Borneo	Common to fine	1s a 2s 4d
INDIARUBBER, (Contd). Java, Sing. & Penang lb.	Foul to good clean ..	8d a 3s 3d
Mozambique ,,	Good to fine Ball ...	2s 8d a 3s 4d
	Ordinary to fair Ball..	2s a 2s 10½d
	Low sandy Ball ..	1s 3d a 1s 7d
	Sausage, fair to good...	2s 6d a 3s 1d
	Liver and livery Ball	2s 4d a 3s 1½d
Nyassaland ..	Fair to fine ball .	3s a 3s 2d
Madagascar ,,	Fr to fine pinky & white	3s a 3s 1d
	Fair to good black .	2s a 2s 10d
	Niggers, low to fine ..	11d a 2s 4d
INDIGO, E.I. ,,	Bengal—	
	Shipping mid to gd violet	3s 4d a 4s 4d
	Consuming mid. to gd.	2s 9d a 3s 2d
	Ordinary to mid.	2s 4d a 2s 8d
	Mid. to good Kurpah	2s 2d a 2s 8d
	Low to ordinary	1s 10d a 2s 1d
	Mid. to good Madras	1s 6d a 2s 8d
MACE, Bombay & Penang per lb.	Pale reddish to fine	2s a 3s
	Ordinary to fair	1s 4d a 1s 11d
	Pickings	1s 3d a 1s 4d
MYRABOLANS, Madras cwt	Dark to fine pale UG	6s a 7s
	Fair Coast	5s 6d a 6s
Bombay ,,	Jubblepore	4s 3d a 7s
	Bhimlies	4s 9d a 9s 6d
	Rhajpore, &c.	4s 3d a 8s
Bengal ,,	Calcutta	4s 6d a 6s
NUTMEGS— lb.	64's to 57's	2s 1½d a 2s 6d
Bombay & Penang ,,	110's to 65's	11½d a 2s 1d
	160's to 130's	6d a 11d
NUTS, ARECA cwt.	Ordinary to fair fresh	15s a 17s
NUX VOMICA, Bombay per cwt.	Ordinary to middling	4s a 5s 6d
Madras	Fair to good bold fresh	7s a 10s
	Small ordinary and fair	5s 6d
OIL OF ANISEED lb	Fair merchantable	5s 6d a 5s 9d
CASSIA ,,	According to analysis	3s 6d a 4s
LEMONGRASS ,,	Good flavour & colour	3d
NUTMEG ,,	Dingy to white	3d a 3½d
CINNAMON ,,	Ordinary to fair sweet	3½d a 1s 6d
CITRONELLE ,,	Bright & good flavour	11d a 1/0½d
ORCHELLA WEED—cwt		
Ceylon ,,	Mid. to fine not woody..	10s a 12s 6d
Zanzibar. ,,	Picked clean flat leaf ..	10s a 16s
	,, wiry Mozambique	10s a 11s
PEPPER—(Black) lb.		
Alleppee & Tellicherry	Fair to bold heavy ..	6¼d a 6 5-16d
Singapore	Fair	6¼d
Acheen & W. C. Penang	Dull to fine ...	5½d a 6¼d
PLUMBAGO, lump cwt.	Fair to fine bright bold	35s a 40s
	Middling to good small	21s a 32s
chips ,,	Dull to fine bright ..	10s a 20s
dust ,,	Ordinary to fine bright	5s a 10s
SAFFLOWER ,,	Good to fine pinky	65s a 75s
	Inferior to fair	40s a 60s
SANDAL WOOD— Bombay, Logs ton.	Fair to fine flavour ..	£20 a £50
Chips ,,	... ...	5s a £8
Madras, Logs ,,	Fair to good flavour ..	£20 a £50
Chips ,,	Inferior to fine	£4 a £8
SAPANWOOD Ceylon ,,	Fair to good	£5 a £5 10s
Manila ,,	Rough & rooty to good bold smooth..	£4 10s a £5 15s
Siam ,,		£7
SEEDLAC cwt.	Ord. dusty to gd. soluble	51s 6d a 59s 6d
SENNA, Tinnevelly lb	Good to fine bold green	5d a 8d
	Fair middling medium	4d a 5½d
	Common dark and small	1½d a 3½d
SHELLS, M. o'PEARL— Bombay cwt.	Bold and A's / D's and B's / Small ...	£3 17,6a £4 17/6
Mergui ,,	Small to bold ..	£5 12/6 a £7 10s
Mussel ,,	Small to bold ...	22s a 57s 6d
TAMARINDS, Calcutta... per cwt.	Mid. to fine bl'k not stony	15s a 16s
Madras	Stony and inferior ..	7s 6d a 11s
TORTOISESHELL— Zanzibar & Bombay lb.	Small to bold dark mottle part heavy	16s a 21s
TURMERIC, Bengal cwt.	Fair ...	28s nom.
Madras ,,	Finger fair to fine bold bright	25s a 27s 6d
Do. ,,	Bulbs ..	20s a 21s
Cochin ,,	Finger ..	24s
	Bulbs ..	7s 6d
VANILLOES— lb.		
Mauritius ... 1sts	Gd. crysallized 3½ a 9 in	16/ a 24/
Bourbon ... 2nds	Foxy & reddish 4½ a 8 ,,	15/ a 18/
Seychelles 3rds	Lean and inferior ...	8/ a 13/
VERMILION lb.	Fine, pure, bright ...	3s 3d
WAX, Japan, squares cwt	Good white hard ...	33s 6d